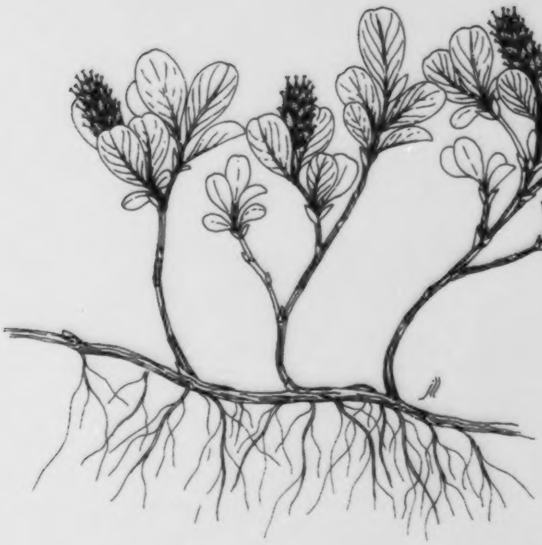
Volume 5

DICOTYLEDONS
(SALICACEAE THROUGH
ZYGOPHYLLACEAE)
AND
PTERIDOPHYTES



ILLUSTRATED FLORA OF BRITISH COLUMBIA

edited by George W. Douglas, Del Meidinger and Jim Pojar

BRITISH
COLUMBIA

Ministry of Environment, Lands and Parks
Ministry of Forests

MARCH 2000

DOC
BC
E5236
D:1558
1998
c.3
v.5

BC
ES 236
D:I558
1998
c 5
v.5

FOREWORD

British Columbia, Canada's most westerly province, has a bounty of biological diversity. British Columbia's snowclad peaks, rain-drenched forests, arid grasslands, all sizes of rivers, lakes, and wetlands, and a long and rugged coast provide habitats for more species of living organisms than are found anywhere else in Canada. However, this very diversity means that there is much to be discovered about these organisms – their distribution, abundance, habitat requirements, and interrelationships with their environment. Increasing our knowledge of this biodiversity will help us with the complex task of sustainably managing our land and waters.

In 1992, the provincial government initiated a co-operative biodiversity research program with funding from the Corporate Resource Inventory Initiative, the British Columbia Ministries of Forests (Research Branch), Environment, Lands, and Parks (Wildlife and Habitat Protection Branches), and Tourism and Culture (Royal B.C. Museum), and the Forest Resource Development Agreement (FRDA II).

In 1995, the Ministry of Forests Research Branch and the Ministry of Environment, Lands and Parks developed a biodiversity research and extension strategy, with the assistance of the provincial research community. This strategy was presented to Forest Renewal BC (FRBC), who provided funding for a program beginning in 1995. The goal of the extension component of this program is to extend information to scientists, resource managers, and the public through biodiversity publications. These publications are intended to increase awareness and understanding of biodiversity, promote the concepts and importance of conserving biodiversity, and communicate provincial government initiatives related to biodiversity. We hope that they will be used as tools for the conservation of British Columbia's rich, living legacy.

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ILLUSTRATED FLORA
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Dicotyledons
(Salicaceae through Zygophyllaceae)
and
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edited by
George W. Douglas[1], Del Meidinger[2] and Jim Pojar[3]

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March 2000

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Canadian Cataloguing in Publication Data
Main entry under title:
Illustrated flora of British Columbia

Volume 3- edited by George W. Douglas, Del Meidinger and Jim Pojar.
Revision in part of: The vascular plants of British Columbia, 1989-1994
Co-published by British Columbia Ministry of Forests.
Includes bibliographical references.
Contents: v. 1. Gymosperms and dicotyledons (Aceraceae through Asteraceae) — v. 2. Dicotyledons (Balsaminaceae through Cuscutaceae) — v. 3. Dicotyledons (Diapensiaceae through Onagraceae) — v. 4. Dicotyledons (Orobanchaceae through Rubiaceae) — v. 5. Dicotyledons (Salicaceae through Zygophyllaceae) and Pteridophytes
ISBN 0-7726-3685-0 (set)

1. Botany - British Columbia. I. Douglas, George W., 1938-. II. Meidinger, Dellis Vern, 1953-. III. Pojar, Jim, 1948-. IV. British Columbia. Ministry of Environment, Lands and Parks. V. British Columbia. Ministry of Forests. VI. Title: Vascular plants of British Columbia.

QK203.B7144 1998 581.9711 C98-960275-3 rev.

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The publisher thanks the University of Washington Press for permission to reprint illustrations from *Vascular plants of the Pacific Northwest* by C.L. Hitchcock *et al.* and the National Resource Council Research Press, National Museums, Canada and Agriculture Canada for use of several additional drawings.

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100-05523/

ACKNOWLEDGEMENTS

Geraldine A. Allen provided valuable suggestions during the initial stages of preparation for *The Vascular Plants of British Columbia* project. Geraldine A. Allen, Adolf Ceska and Fred Ganders reviewed taxonomically difficult groups for that project as well.

The present flora was reviewed by Frank Lomer, Ernie McNaughton and Malcolm Martin. The latter botanists and Anna Roberts also provided the senior editor with manuscript corrections and range information during the past several years. W. (Bill) J. Cody kindly searched the DAO herbarium and provided information on several families.

Special thanks are due to our illustrators: Oldriska Ceska, Donald Gunn, Gail F. Harcombe, Jane Lee Ling, Sherry Mitchell, Lora May Richards, Elizabeth J. Stephen and Karen Uldall-Ekman.

Many of the initial write-ups for the technical descriptions were contributed by Lynne Milnes. Jenifer Penny made numerous corrections and additions to early drafts. Brenda Costanzo also proofread the final draft of the manuscript.

Elizabeth Campbell prepared the glossary and Marie Fontaine revised it with respect to terms used in the present text. Louise Gronmyr assisted with compiling the textual submission and doing edit corrections. Art press and final typesetting were done by Frances Hunter and Gail F. Harcombe coordinated the prepress and print production of the flora. Cover design was created by Annie Weeks.

The curators of all of the herbaria visited during this study deserve special thanks for providing help whenever needed. The herbaria curators and staff include: George Argus and Michael Shchepanek (The National Herbarium, National Museums, Ottawa); T. Christopher Brayshaw, John Pinder-Moss, Jim Cosgrove, Joan Kerik, Lesley Kennes and Leon Pavlick (Herbarium, Royal British Columbia Museum, Victoria); William Cody, Gisele Mitrow and Paul Catling (Vascular Plant Herbarium, Department of Agriculture, Ottawa); Olivia Lee and Jack Maze (Herbarium, Department of Botany, University of British Columbia, Vancouver); Geraldine Allen and Brenda Costanzo (Herbarium, Department of Biology, University of Victoria); Ray Coupé and Anna Roberts (Herbarium, B.C. Ministry of Forests, Williams Lake); and Jim Pojar and Karen McKeown (Herbarium, B.C. Ministry of Forests, Smithers).

We would also like to thank John Kartesz for allowing us to use an early version of the Digital Floristic Synthesis to aid with nomenclatural problems.

The production of this extension project was made possible through the funding support of Forest Renewal British Columbia (FRBC), the B.C. Ministry of Environment, Lands and Parks, Wildlife and Resources Inventory branches, and the B.C. Ministry of Forests, Research Branch and Forest Sciences Section, Prince Rupert Region. Project support by managers in the Conservation Data Centre, B.C. Ministry of Environment, Lands and Parks, and Research Branch, B.C. Ministry of Forests has made this project possible.

We sincerely appreciate all the contributions everyone has made to this project. Without their assistance, it would not have been possible.

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INTRODUCTION

This flora, projected to be in eight volumes, keys, describes and illustrates all of the flowering plants and vascular non-flowering plants, both native and naturalized, known to occur at the time of writing, within the borders of British Columbia. In part, it is a revision of *The Vascular Plants of British Columbia* (Douglas *et al.* 1989, 1990, 1991, 1994). Keys are included for all genera, species, subspecies and varieties. Family keys and maps for all taxa will appear in Volume 8. Species previously recorded for the province but excluded from this treatment appear in an annotated list in Appendix I. Nine new species, discovered in the province in recent years, have been added to families in Volume 5. Recent taxonomical or nomenclatural research has also resulted in new name changes for 30 taxa since Douglas *et al.* (1991, 1994). Appendix II lists these new name changes.

FORMAT

The floristic treatment is in alphabetical order by families, genera and species because most users may not be familiar with the more traditional "Englerian system". These users (e.g., foresters, wildlife biologists, park managers, naturalists, students, etc.) often require specific information about a species. Thus we have attempted to include the most frequently required information. Each entry includes the following:

Synonyms

Synonyms are given only when there are references in major or pertinent floristic treatments to a given species by another name or names. These names, for the most part, follow Kartesz and Meacham (1998), who have done an extremely thorough job of researching specific names and their authorities.

English Names

We provide an English name for each species, based mainly on names appearing most frequently in the western North American literature.

Habitat and Moisture Regime

A brief description of the habitat preference of a species is given. Moisture regime is denoted by a simple (wet – moist – mesic – dry) scale.

Vegetation Zones

The elevational limits of a species are presented using vegetation zones. The zonal system used here, unlike some of the regional zonation systems (Krajina 1965; Rowe 1959, 1972; Franklin and Dyrness 1973), has wide application in the northern hemisphere and differs only slightly from that proposed by Dansereau (1975) and Meusel *et al.* (1965) and recommended by Löve (1970) in a review of the subject. The *montane zone* includes all continuous forests in British Columbia except for the coastal lowlands and some islands, which comprise the *lowland zone*. The upper forests in southern British Columbia, included by some ecologists (e.g., Krajina 1965) in the subalpine zone, constitute the *upper montane zone* in this work. The *subalpine zone* is defined as that area above the montane zone and below the upper limit of conifers as an upright tree form (Douglas 1972). In the southern part of the province, subalpine vegetation consists of a meadow/tree-clump complex (Douglas 1971, 1972), while in the northern part of the province the subalpine zone is dominated by tall shrubs (mainly three- to four-metre *Salix)* and scattered trees (Douglas 1974, Krajina 1975). Above the subalpine zone is the *alpine zone*, where trees occur only in krummholz (dwarfed) form and the vegetation is extremely short (less than 1 metre) and commonly referred to as alpine tundra (Krajina 1969, Douglas 1972, Douglas and Bliss 1977). The *steppe zone* (Daubenmire 1970) occurs in the interior of the province and includes what is often referred to as sagebrush or grassland vegetation. This zone occurs at lower elevations in the Thompson, Okanagan, Kootenay and Columbia River valleys in southern British Columbia. Parts of the Fraser and Thompson plateaus also have grassland or steppe.

Abundance

The abundance of a species is given by a **General** scale: rare – infrequent – frequent – common. The rare plants are well documented in Douglas *et al.* (1998). Most of the common plants are also well known from numerous other sources. However, limited collecting or research enabled us to make only **General** statements about the abundance of some of the infrequent or frequent species.

Range

The **General** distribution of a species, both within and outside the province, is presented. Figure 1 illustrates the **General** areas of the province referred to in the text. Maps compiled at the Royal British Columbia Museum were extremely helpful for the more common species. Douglas *et al.* (1998) provide maps of the distributions of rare plants. Abbreviations used within the province are as follows:

E - Eastern
EC - Eastcentral
N - Northern
NE - Northeastern
NW - Northwestern
S - Southern
SC - Southcentral
SE - Southeastern
SW - Southwestern
WC - Westcentral

For ranges outside of B.C. the outer peripheries (i.e., provinces/states) of the ranges are given using the following abbreviations:

Alberta	AB
British Columbia	BC
Manitoba	MB
New Brunswick	NB
Newfoundland	NF
Northwest Territories	NT
Nova Scotia	NS
Ontario	ON
Prince Edward Island	PE
Quebec	PQ
Saskatchewan	SK
Yukon	YT

Alabama	AL
Alaska	AK
Arizona	AZ
Arkansas	AR
California	CA
Colorado	CO
Connecticut	CT
Delaware	DE
District of Columbia	DC
Florida	FL
Georgia	GA
Hawaii	HI
Idaho	ID
Illinois	IL
Indiana	IN
Iowa	IA
Kansas	KS
Kentucky	KY
Louisiana	LA
Maine	ME
Maryland	MD
Massachusetts	MA
Michigan	MI
Minnesota	MN
Mississippi	MS
Missouri	MO
Montana	MT
Nebraska	NE
Nevada	NV
New Hampshire	NH
New Jersey	NJ
New Mexico	NM
New York	NY
North Carolina	NC
North Dakota	ND
Ohio	OH
Oklahoma	OK
Oregon	OR
Pennsylvania	PA
Rhode Island	RI
South Carolina	SC
South Dakota	SD
Tennessee	TN
Texas	TX
Utah	UT
Vermont	VT
Virginia	VA
Washington	WA
West Virginia	WV
Wisconsin	WI
Wyoming	WY

Mexico	MX

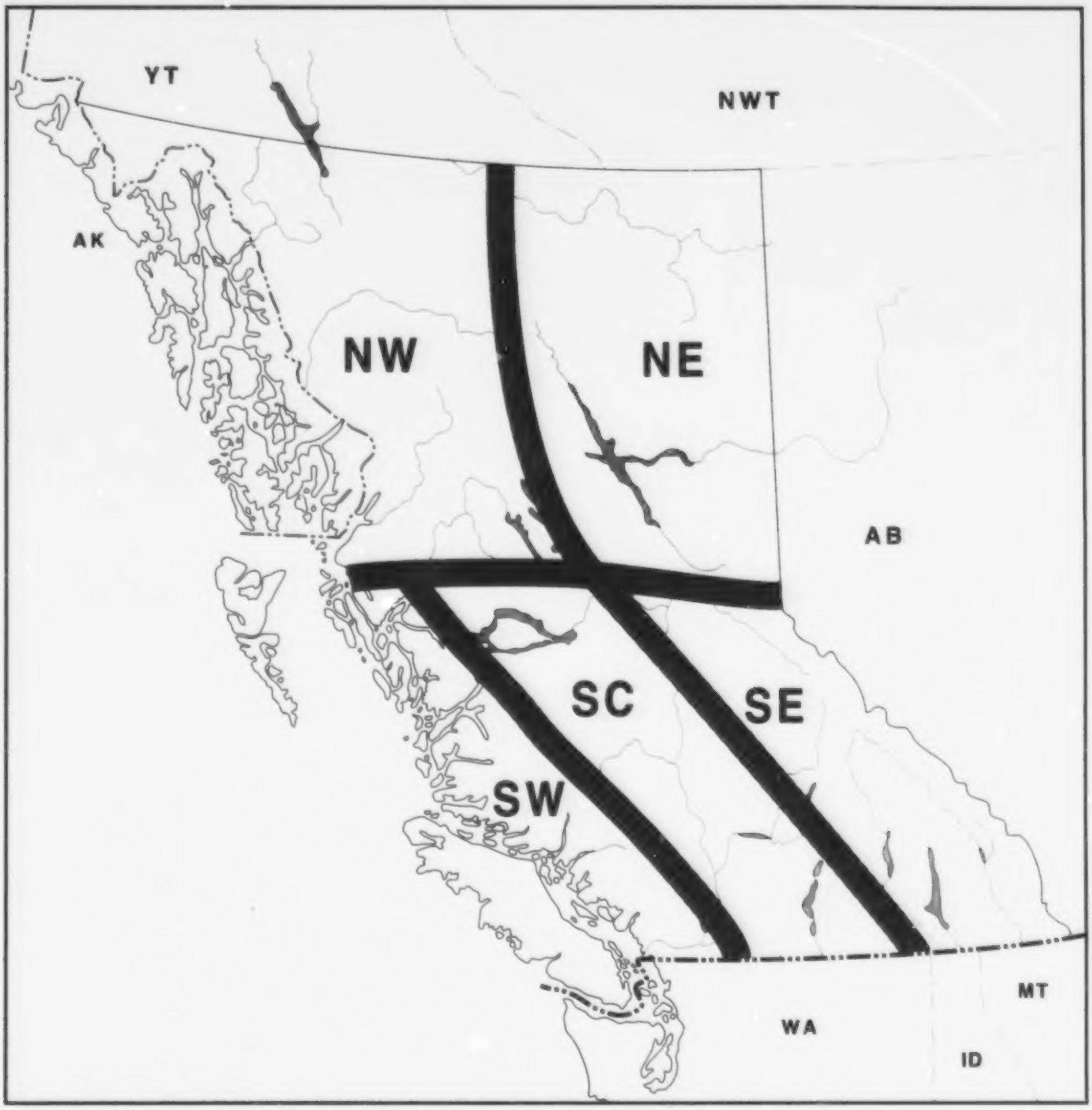

YT
NWT
AK
NW
NE
AB
SC
SE
SW
MT
WA
ID

Figure 1. Geographical Regions of British Columbia.

Descriptions

Major morphological characters are given for each taxon. In most cases, technical terminology has been kept to a minimum since most of our users have a limited botanical background. All terms, both technical and simplified, appear in the glossary.

Notes

Specific items of importance or problems, especially those related to taxonomy and nomenclature, are noted. Infraspecific taxa worthy of recognition are keyed here.

We have also appended a floristic bibliography, arranged by families, for users wishing to explore the taxonomy further.

DATABASE

The present manual is based on a wealth of regional publications dating back over a hundred years. In addition, most of the species (especially the rare and infrequent ones) have been examined in various Canadian herbaria. Historically, the floristic documentation of British Columbia's flowering plants and vascular non-flowering plants began with the enumeration of the extensive collections of J. Macoun (1883-1890). This was soon followed by the botanical contributions of his son, J.M. Macoun (1889, 1894-1906). In 1915, the first provincial flora appeared (Henry 1915), treating the southern part of the province. A supplement to this work was later provided by Eastham (1947). The southern part of the province was also included in a treatment of Pacific Northwest vascular plants by Hitchcock *et al.* (1955-1969) – later edited and revised by Hitchcock and Cronquist (1973). During this same period several other major works also appeared. Boivin (1966-1967), after numerous visits to Canadian and American herbaria, produced a checklist of Canadian vascular plants. In his *Flora of Alaska and Neighboring Territories*, Hultén (1968) provided brief descriptions with range maps that, in many cases, included British Columbian species. Meanwhile, in a treatment of the Queen Charlotte Islands' vascular plants, Calder and Taylor (1968) contributed one of the few floras dealing solely with a part of British Columbia. British Columbia was again included in a regional flora of northwestern North America when Welsh (1974) treated the plants of Alaska and adjacent parts of Canada, including northern British Columbia. A literature review by Taylor and MacBryde (1977), mainly of North American works, resulted in a resource inventory of vascular plants for British Columbia. (Unfortunately, this extensive review treated several hundred erroneous citations as valid records for the province. It also ignored many herbaria records that had never been published.) Recently, a modern Canadian flora was produced by Scoggan (1978-1979). All of the province's rare or infrequent plants were examined and verified in various Canadian herbaria by Straley *et al.* (1985) and, more recently, by Douglas *et al.* (1998). Finally, the BC flora was documented, annotated and all species keyed in *The Vascular Plants of BC* (Douglas *et al.* 1989, 1990, 1991, 1994).

In addition to the major works mentioned above, there have been numerous taxonomic, floristic and related research papers dealing with British Columbia's vascular plants. Many of these are cited in the floristic bibliography by Douglas *et al.* (1983) and many are specifically referenced in this manual.

This study was supplemented by the examination of specimens in all major Canadian herbaria and some US herbaria (e.g., UC, CAS, WTU), as well as a complete review of the pertinent literature.

Although descriptions and illustrations are provided for all of British Columbia's plant species in this manual, additional descriptions and/or illustrations may also be found in several floras (Abrams 1923-1951, Argus 1973, Cody 1996, Cronquist *et al.* 1986- 1994, Fernald 1950, Ferris 1960, Hickman 1993, Hitchcock *et al.* 1955-1969, Packer 1983, Porsild and Cody 1980, Tutin *et al.* 1964-1980, Welsh 1974) or in treatments of some British Columbian plant families (Brayshaw 1976, 1985, 1996a, 1996b; Douglas 1982, 1995; Szczawinski 1959, 1962; Taylor 1963, 1966, 1970, 1973, 1974a, 1974b, 1983).

TAXONOMIC CONCEPTS

We have a practical view of species limits. Therefore, species had to be readily characterized morphologically in order to produce user-friendly keys. Many of the keys were newly constructed while others were adapted for our British Columbia plants from well-tested manuals.

Wherever possible, geographically separate, or largely separate, infraspecific taxa are treated at the subspecies level, while those with sympatric ranges are treated at the varietal level. Because we have not published any nomenclatural changes associated with the production of the manual, this distinction between subspecies and variety was not always possible. In this work, we have not used more than one infraspecific rank for a single species. Taxa are not recognized at the *forma* level.

SALICACEAE

1. Floral bracts fringed; flowers with a non-glandular, cup-like disk; buds with 3-10 overlapping scales .... *Populus*

1. Floral bracts entire, rarely irregularly toothed; flowers with 1-2 slender or cup-like, glandular nectaries; buds with a single scale .... *Salix*

POPULUS

1. Buds shiny but not resinous; leaf stalks strongly flattened laterally; bark smooth; stamens 6-14; carpels 2-3 .... *P. tremuloides*

1. Buds resinous; leaf stalks round in cross-section or slightly flattened laterally; bark rough; stamens 30-60; carpels 3-4.

   2. Leaves strongly resinous, distinctly paler beneath, the bases rounded to shallowly heart-shaped, leaf stalks terete; plants common throughout BC, native .... *P. balsamifera*

   2. Leaves not strongly resinous, green on both sides, the bases squared-off; leaf stalks flattened laterally near blade; plants rare, introduced in SE BC .... *P. deltoides*

Populus balsamifera L. (*P. balsamifera* var. *subcordata* Hylander and *P. balsamifera var. hastata* [Dode] Brayshaw are intermediate between the 2 subspecies, *P. trichocarpa T. & G.* = ssp. *trichocarpa*)

balsam poplar (ssp. *balsamifera*); **black cottonwood** (ssp. *trichocarpa*)

HABITAT/RANGE:

Moist uplands and floodplains in the montane zone; ssp. *balsamifera* – common in N and E BC; ssp. *trichocarpa* – common throughout BC except rare on Queen Charlotte Islands; ssp. *balsamifera* – N to YT, AK and NT, E to NF and S to NY, VI, IL, IA, CO, ID and OR; ssp. *trichocarpa* – N to S AK and YT, E to SW AB and S to ND, WY, UT, NV and CA.

DESCRIPTION:

General: Dioecious tree up to 50 m tall; not colonial; branches brown the first year, turning grey later; twigs smooth or sparsely hairy.

Leaves: Alternate, deciduous, simple, narrowly to broadly egg-shaped or lanceolate, 5-20 cm long, 3-12 cm wide, the bases tapered to heart-shaped or squared-off smooth, finely toothed and hairy on the margins, the teeth often tipped with a callous gland, lower side whitish or pale green and brownish; leaf stalks 2-10 cm long, often with a pair of glands near the blade; buds finely hairy with fringed scales.

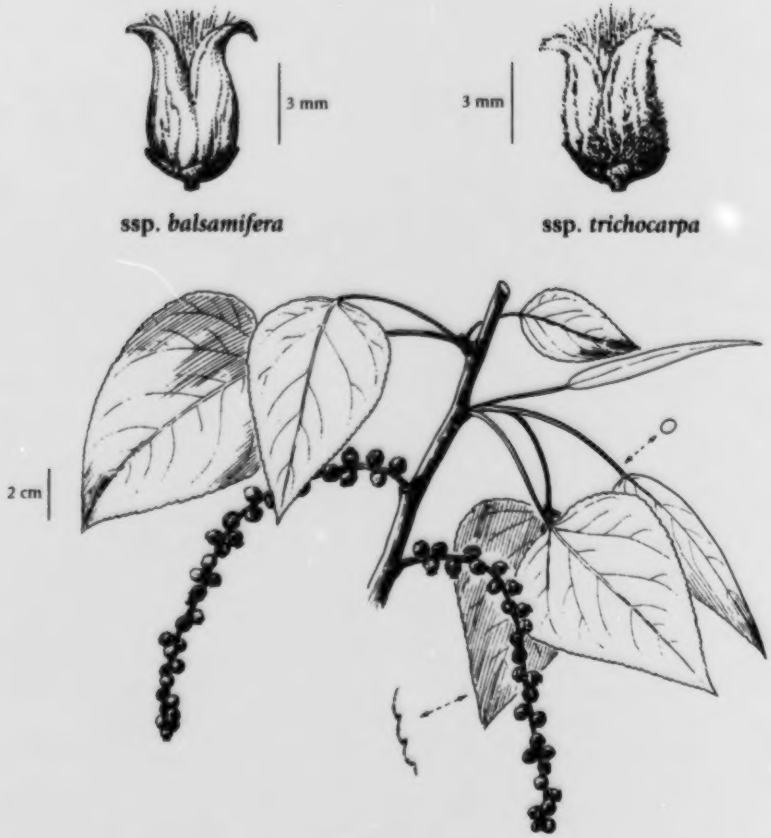
Flowers: Borne in catkins; male catkins 2-3 (5) cm long, soon deciduous, with 8-60 stamens; female catkins 8-20 cm long.

Fruits: Capsules, broadly egg-shaped, carpels 2-3, smooth or hairy, nearly unstalked.

Notes: Two subspecies occur in BC. The hybrids *P. angustifolia* James x *P. balsamifera* ssp. *trichocarpa* (*P.* x *brayshawii* Boivin) and *P. balsamifera* ssp. *trichocarpa* x *P. nigra* L. var. *italica* DuRoi are rare in BC:

1. Ovaries and capsules smooth; leaves pale green and brownish beneath .... ssp. *balsamifera*

1. Ovaries and young capsules hairy; leaves whitish beneath .... ssp. *trichocarpa* (T. & G.) Brayshaw



ssp. ***balsamifera***

ssp. ***trichocarpa***

Populus balsamifera

Populus deltoides **Bartram**

eastern cottonwood

HABITAT/RANGE:

Mesic to dry fields and disturbed sites; rare in SC and SE BC; introduced from E North America.

DESCRIPTION:

General: Dioecious tree up to 20 m tall; not colonial; branches yellowish-brown to grey; twigs yellowish, smooth.

Leaves: Alternate, deciduous, simple, triangular, 4-10 cm long, 4-11 cm wide, the bases heart-shaped or squared-off, smooth, finely toothed and hairy, the teeth often callous-tipped, both sides green; leaf stalks 4-14 cm long, often with a with a pair of glands near the blade; buds finely hairy with fringed scales, resinous.

Flowers: Borne in catkins; male catkins 5-9 cm long, soon deciduous, with 40-60 stamens; female catkins 8-15 cm long.

Fruits: Capsules, egg-shaped, carpels 3-4, smooth, short-stalked.

Notes: Two subspecies apparently occur in BC:

1. Winter buds smooth; emerging leaves long-hairy; flower stalks variable in length .... ssp. *deltoides*

1. Winter buds pubescent; emerging leaves smooth; flowers stalks uniform in length (less than 6 mm long) .... ssp. *monilifera* (W. Aiton) Eckenwalder

Populus tremuloides **Michx.** (*P. tremuloides* var. *vancouveriana* [Trel.] Sarg., *P. tremuloides* var. *aurea* [Tidestr.] Daniels)

trembling aspen; quaking aspen

HABITAT/RANGE:

Moist to dry ravines, depressions, meadows, ridges, upland forests and occasionally on floodplains in the lowland and montane zones; common throughout BC, except infrequent on SW coast, absent on Queen Charlotte Islands; N to AK, YT and NT, E to NF and S to NY, NC, IN, AK, TX, NM, AZ, CA and MX.

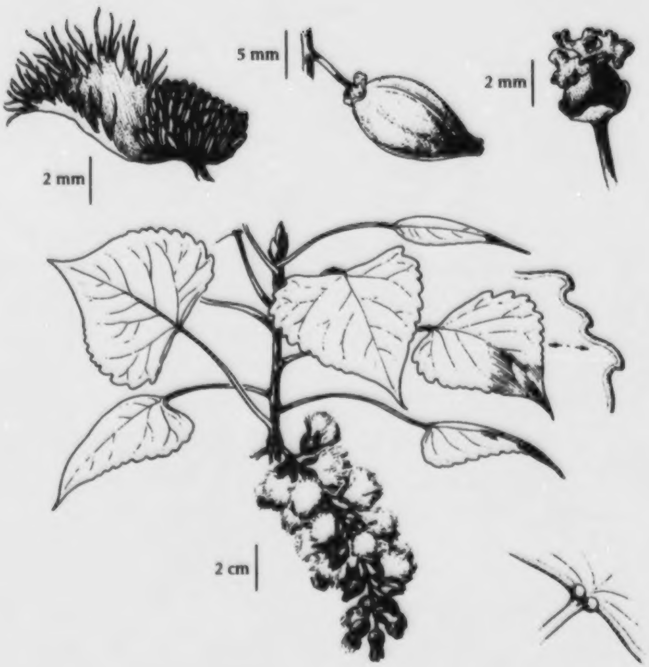
DESCRIPTION:

General: Dioecious tree up to 10-25 m tall; colonial; branches greenish-white; twigs greenish-white, smooth.

Leaves: Alternate, deciduous, simple, broadly egg-shaped, kidney-shaped or circular, 2.5-9 cm long, 2.5-8 cm wide, the bases rounded to slightly heart-shaped, smooth, finely toothed and fringed with long white hairs, upper side green, lower side paler; leaf stalks 2-7.5 cm long; buds smooth.

Flowers: Borne in catkins; male catkins 2-3 cm long, soon deciduous, with 6-14 stamens; female catkins 4-10 cm long.

Fruits: Capsules, lanceolate to narrowly egg-shaped, carpels 2, smooth, short-stalked.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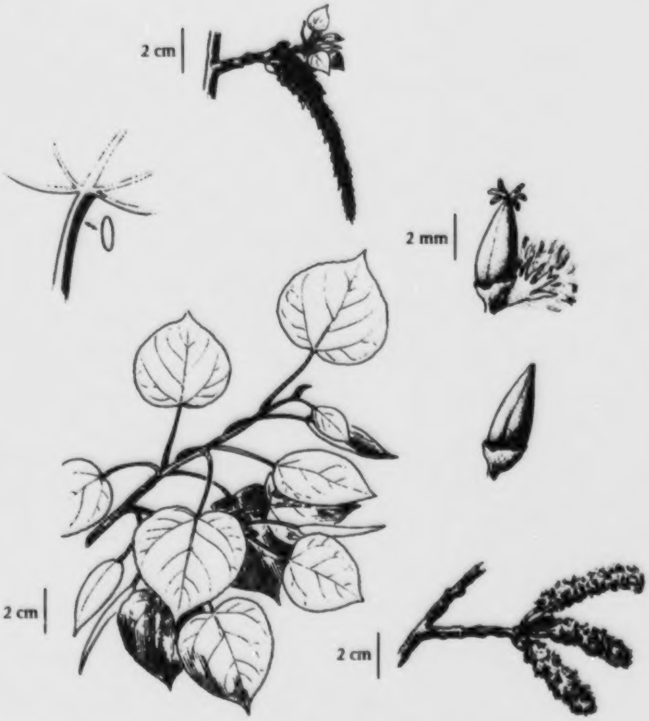
Populus deltoides ssp. *monilifera*


2 cm
2 mm
2 cm
2 cm

Populus tremuloides

SALIX[1]

1. Dwarf alpine shrubs.

  2. Leaves green beneath, not glaucous ..... *S. polaris*

  2. Leaves glaucous beneath.

    3. Floral bracts smooth; catkins terminal on previous year's shoot.

      4. Leaves 1.5-6.6 cm long, silky beneath; female catkins with 20-40 or more flowers; plants layering; capsules 4.5-5 mm long ..... *S. reticulata*

      4. Leaves 0.5-2.5 cm long, smooth beneath; female catkins with 2-10 (-25) flowers; plants forming rhizomatous mats; capsules 3-4 mm long ..... *S. nivalis*

    3. Floral bracts hairy; catkins 1 to several just below tip of previous year's shoot.

      5. Leaves highly glossy above; juvenile leaves hairy; ovaries smooth or hairy in patches or streaks ..... *S. stolonifera*

      5. Leaves dull or shiny above; juvenile leaves smooth or long soft-hairy; ovaries hairy, rarely smooth.

        6. Ovaries short-silky (rarely smooth); leaves narrower (mean length-width ratio 3.2), persistent more than 1 year, veins sweeping along margins to the tips; plants forming rhizomatous mats, 1-4 cm tall ..... *S. cascadensis*

        6. Ovaries long soft-hairy; leaves usually broader (mean length-width ratio 2.3), not persistent more than 1 year, veins not sweeping along margins to the tips; plants forming mats by layering or erect, 2-25 cm tall.

          7. Floral bracts dark brown to black; leaves usually sparsely hairy beneath with long, straight hairs; plants 3-25 cm tall ..... *S. arctica*

          7. Floral bracts tawny to light brown; leaves nearly smooth beneath; plants 2-10 cm tall ..... *S. petrophila*

1. Trees or erect shrubs.

  8. Female floral bracts deciduous after flowering, the bracts tawny.

    9. Trees.

      10. Bud scale margins free and overlapping; stipules lacking except on vigorous shoots ..... *S. amygdaloides*

      10. Bud scale margins fused; stipules leaflike or rudimentary.

        11. Leaf stalks not glandular at top; plants forming colonies by root shoots; leaf margins entire or remotely and minutely spiny-toothed ..... *S. exigua*

        11. Leaf stalks with glandular dots or lobes at top; plants not colonial; leaf margins saw-toothed.

          12. Stipules strongly glandular; female catkins moderately densely flowered; capsule stalks 0.8-4 mm long; native ..... *S. lucida*

          12. Stipules not strongly glandular; female catkins loosely flowered; capsule stalks 0.2-0.8 mm long; introduced.

            13. Leaves persistently silky; styles 0.2-0.4 mm long; ovary beak slightly bulged below style; branches flexible or somewhat brittle at base; stipules short, sharp-pointed ..... *S. alba*

            13. Leaves silky at first soon becoming smooth; styles 0.4-1 mm long; ovary beak gradually tapering to style; branches highly brittle at base; stipules long, tapering to a fine point ..... *S. rubens*

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[1] Contributed by G.W. Argus.

9. Shrubs.

  14. Colonial shrubs, shoots arising from roots; leaves linear or narrowly elliptic to elliptic, margins minutely toothed, sometimes entire; catkins often branched.

    15. Leaves linear (length/width 10-23), the sides parallel, green beneath; styles 0-0.15 mm long .... *S. exigua*

    15. Leaves narrowly elliptic to elliptic (length/width 2.5-8.5), the sides not parallel, pale or rarely slightly glaucous beneath; styles 0.2-0.4 mm long.

      16. Ovaries smooth; stigmas short and blunt; leaves with spreading hairs .... *S. melanopsis*

      16. Ovaries hairy; stigmas long and slender; leaves with appressed, silky hairs .... *S. sessilifolia*

  14. Non-colonial shrubs; leaves narrowly elliptic or narrowly to broadly egg-shaped, margins saw-toothed; catkins unbranched.

    17. Stipules leaflike, egg-shaped; leaf tips usually long tapering to a tail-like tip; twigs hairy or smooth, brittle at base; catkins flowering as leaves emerge, not persisting .... *S. lucida*

    17. Stipules absent, replaced by minute glandular lobes or clusters of glands; leaf tips usually shortly sharp-pointed; twigs smooth, flexible at base; catkins flowering after leaves emerge, often persisting through the winter .... *S. serissima*

8. Female floral bracts persistent after flowering, bracts tawny, brown or black.

  18. Colonial shrubs, shoots arising from roots; leaves narrowly egg-shaped, the bases tapering to a stalk 0-3 mm long .... *S. setchelliana*

  18. Non-colonial shrubs; leaves not as above.

    19. Leaves green beneath, not glaucous or surface obscured by dense hairiness.

      20. Leaf margins toothed.

        21. Leaves smooth beneath.

          22. Ovaries hairy; leaves leathery .... *S. maccalliana*

          22. Ovaries smooth, leaves thin.

            23. Juvenile leaves hairy.

              24. Juvenile and mature leaves usually with white and rust-coloured hairs; leaf stalks not glandular at top; female catkins on leafy twigs 0.5-18 mm long .... *S. pseudomyrsinites*

              24. Juvenile and mature leaves with white hairs; leaf stalks glandular or not at top; female catkins on leafy twigs 1-5 mm long .... *S. boothii*

            23. Juvenile leaves smooth.

              25. Plants 0.1-0.6 m tall; leaves smooth above; forming colonies by layering; twigs very sparsely hairy; leaves 1.7-6 cm long; styles 0.3-0.5 mm long .... *S. myrtillifolia*

              25. Plants 1-7 m tall; leaves moderately hairy above, at least on midrib; not forming colonies; twigs densely hairy; leaves 3-11 cm long; styles 0.4-1.6 mm long .... *S. pseudomyrsinites*

        21. Leaves hairy beneath.

          26. Leaves long soft-hairy to woolly beneath, smooth above .... *S. vestita*

          26. Leaves long or short soft-hairy beneath.

27. Leaves long soft-hairy beneath; female catkins on leafy twigs 3-30 mm long .... *S. commutata*

27. Leaves sparsely short soft-hairy beneath; female catkins not on leafy twigs 0-2 mm long . ... *S. tweedyi*

20. Leaf margins entire.

28. Female catkins not on leafy twigs; leaf margins rolled under or flat.

29. Leaves densely white long-woolly beneath, bright green above, margins rolled under; stipules linear, 4-20 mm long; capsule stalks 0-0.4 mm long .... *S. alaxensis*

29. Leaves silky or long-woolly beneath; margins rolled under or flat; stipules narrowly elliptic to egg-shaped, 1.2-5 mm long; capsule stalks 0.2-2 mm long.

30. Twigs with a bloom, smooth, brittle at base; buds not oily; leaf margins rolled under; capsule stalks 0.6-2 mm long .... *S. drummondiana*

30. Twigs without a bloom, coarsely long soft-hairy, not brittle at base; buds oily; leaf margins flat; capsule stalks 0.2-0.6 mm long .... *S. barrattiana*

28. Female catkins on leafy twigs; leaf margins rolled under.

31. Leaves sparsely to densely white-woolly beneath, cobwebby above, narrow (length/width 3.4-8), base shortly sharp-pointed; capsules 5-7 mm long; ovaries densely woolly .... *S. candida*

31. Leaves silky beneath, bright green and nearly smooth above, broad (length/width 2.4-3), base wedge-shaped; capsules 3.5-5.5 mm long; ovaries sparsely silky .... *S. sitchensis*

19. Leaves glaucous beneath.

32. Leaf margins toothed.

33. Leaves smooth beneath at maturity.

34. Ovaries smooth.

35. Stipules leaflike but soon deciduous; juvenile leaves yellow-green, translucent .... *S. pyrifolia*

35. Stipules leaflike and persistent; juvenile leaves greenish or reddish, opaque.

36. Stipules persistent for several years, linear to egg-shaped, tips gradually tapering; leaf margins blunt-toothed; nectaries longer than or equal to capsule stalks .... *S. richardsonii*

36. Stipules not persistent more than 1 year, elliptic to broadly egg-shaped, tips usually rounded; leaf margins saw-toothed; nectaries shorter than capsule stalks.

37. Female catkins not on leafy twigs, even lacking leafy bracts at base .... *S. pseudomonticola*

37. Female catkins on leafy twigs, sometimes very short but then with leafy bracts at base.

38. Capsule stalks 1.3-4.2 mm long; stipules egg-shaped, tips rounded; juvenile leaves usually reddish; twigs usually smooth, sometimes with spreading hairs .... *S. prolixa*

38. Capsule stalks 0.3-1.5 mm long; stipules elliptic, tips shortly sharp-pointed or blunt; juvenile leaves green; twigs hairy.

39. Juvenile leaves white hairy on both surfaces; branchlet hairs spreading; ovaries usually greenish .... *S. barclayi*

39. Juvenile leaves smooth beneath, sparsely hairy, sometimes with rust-coloured hairs, on midrib above; branchlet hairs appressed; ovaries usually red-tinged .... *S. farriae*

34. Ovaries hairy.

40. Female catkins on distinct leafy twigs, 2-7 mm long, flowering as the leaves emerge .... *S. petiolaris*

40. Female catkins not on leafy twigs, rarely on leafy twigs up to 5 mm long, flowering before the leaves emerge.

41. Leaves dull or satiny above, veins widely spaced and irregular; capsule stalks 2-2.7 mm long; stigmas equal to or longer than styles .... *S. discolor*

41. Leaves highly glossy above, veins closely spaced and parallel; capsule stalks 0.2-0.9 mm long; stigmas shorter than styles.

42. Stipules absent or rudimentary, sometimes leaflike but then not as prominent, tips shortly sharp-pointed; leaf stalks shallowly grooved above, female catkins rarely on leafy twigs up to 5 mm long .... *S. planifolia*

42. Stipules leaflike, prominent, tips long tapering to a point; leaf stalks convex to flat above; female catkins rarely on leafy twigs up to 2.5 mm long .... *S. pulchra*

33. Leaves hairy beneath at maturity.

43. Leaves saw-toothed.

44. Ovaries smooth .... *S. tweedyi*

44. Ovaries hairy.

45. Leaves finely saw-toothed, silky beneath, smooth above; capsule stalks 0.6-0.9 mm long .... *S. arbusculoides*

45. Leaves coarsely saw-toothed, silky on both surfaces with long hairs; capsule stalks 1.5-4 mm long .... *S. petiolaris*

43. Leaves blunt-toothed.

46. Twigs, buds and juvenile leaves white, long soft-hairy to long-woolly; stipules usually absent except on vigorous twigs; female catkins on short leafy twigs .... *S. hookeriana*

46. Twigs, buds and juvenile leaves not densely long soft-hairy except sometimes in *S. bebbiana*; stipules present; female catkins on leafy twigs or not.

47. Female catkins not on leafy twigs, rarely on leafy twigs up to 5 mm long, flowering before the leaves emerge; floral bracts brown to black; styles greater than 0.5 mm long.

48. Ovaries smooth; leaves smooth or sparsely hairy above, long soft-hairy beneath; juvenile leaves green .... *S. richardsonii*

48. Ovaries silky; leaves smooth above, sparsely hairy beneath with appressed hairs; juvenile leaves reddish.

49. Stipules absent or rudimentary, sometimes leaflike but then not as prominent, tips shortly sharp-pointed; leaf stalks shallowly grooved above, female catkins rarely on leafy twigs up to 5 mm long .... *S. planifolia*

49. Stipules leaflike, prominent, tips long tapering to a point; leaf stalks convex to flat above; female catkins rarely on leafy twigs up to 5 mm long ..... *S. pulchra*

47. Female catkins on distinct, leafy twigs, flowering as the leaves emerge; floral bracts tawny; styles less than 0.5 mm long.

50. Leaves sparsely hairy on both sides with wavy hairs, tips shortly sharp-pointed; capsule stalks 2-5 mm long .... *S. bebbiana*

50. Leaves smooth above except for the impressed veins, silky beneath with straight hairs, tips rounded; capsule stalks 0.4-1.2 mm long .... *S. vestita*

32. Leaf margins entire.

51. Ovaries smooth.

52. Juvenile leaves smooth or sparsely hairy; floral bracts tawny.

53. Stipules present .... *S. raupii*

53. Stipules absent or rudimentary.

54. Capsule stalks 0.3-1.5 mm long; leaves not glaucous above, elliptic to egg-shaped; young leaves often with rust-coloured hairs on midrib above .... *S. farriae*

54. Capsule stalks 2-3.2 mm long; leaves glaucous above, narrowly elliptic or narrowly egg-shaped; lacking rust-coloured hairs .... *S. pedicellaris*

52. Juvenile leaves densely hairy; floral bracts brown or black.

55. Stipules leaflike.

56. Capsule stalks 0.4-1 mm long; branches flexible at base; juvenile leaves sparsely hairy; mature leaves nearly smooth or sparsely hairy .... *S. richardsonii*

56. Capsule stalks 0.5-2 mm long; branches brittle at base; juvenile leaves densely long soft-hairy to long-woolly; mature leaves long soft-hairy on both surfaces .... *S. hookeriana*

55. Stipules absent or rudimentary.

57. Leaves densely to moderately long soft-hairy to long-woolly on both surfaces; floral bracts densely hairy .... *S. hookeriana*

57. Leaves smooth, sparsely hairy on midrib above; floral bracts sparsely hairy .... *S. farriae*

51. Ovaries hairy.

58. Stipules absent.

59. Floral bracts dark brown to black.

60. Capsule stalks 0-0.5 mm long; nectaries longer than capsule stalks; hairs on juvenile and mature leaves white; leaves 1.3-4.3 cm long .... *S. niphoclada*

60. Capsule stalks 1-4 mm long; nectaries shorter than capsule stalks; hairs on juvenile and mature leaves white and rust-coloured; leaves 3.8-11 cm long.

61. Twigs, buds and juvenile leaves densely long soft-hairy to long-woolly; leaves elliptic, broadly elliptic to broadly egg-shaped, hairs white .... *S. hookeriana*

61. Twigs, buds and juvenile leaves not densely long soft-hairy or woolly; leaves linear to narrowly elliptic, hairs often white and rust-coloured.

62. Styles 0.3-0.8 mm long; stipes 1.1-2.1 mm long; juvenile leaf hairs usually including some rust-coloured hairs .... *S. lemmonii*

62. Styles 0-0.3 mm long; stipes 1.5-4 mm long; juvenile leaves with white hairs or sometimes mixed with rust-coloured hairs .... *S. petiolaris*

59. Floral bracts tawny.

63. Leaves 3.2-11 cm long, narrow (length/width ratio 3.6-9); ovaries usually sparsely silky; styles 0-0.3 mm long; capsule stalks 1-4 mm long; nectaries shorter than capsule stalks.

64. Branches glaucous, sometimes very sparsely so; twigs yellow in life drying with dark blotches or dark brown; leaf margins entire; capsules 4-5.2 mm long; capsule stalks 1.2-2.8 mm long .... *S. geyeriana*

64. Branches not glaucous; twigs dark brown in life; leaf margins saw-toothed, if entire, some leaves on plant have serrations; capsules 5-9 mm long; capsule stalks 1.5-4 mm long .... *S. petiolaris*

63. Leaves 1-4.3 cm long, broad (length-width ratio 1.5-3.8); ovaries very densely long soft-hairy or short-woolly; styles 0.2-1.5 mm long; 0-0.5 mm long; nectaries longer than capsule stalks.

65. Female catkins stout to globose, densely flowered, 0.5-3.3 cm long; floral bracts tawny; leaf margins flat .... *S. brachycarpa*

65. Female catkins usually slender but sometimes stout to nearly globe-shaped, moderately flowered, 1-5.5 cm long; floral bracts tawny, brown, or black; leaf margins slightly rolled under .... *S. niphoclada*

58. Stipules present, at least on later leaves.

66. Female catkins not on leafy twigs, rarely on leafy twigs up to 5 mm long, flowering as the leaves emerge.

67. Twigs and leaf stalks velvety, the hairs short, erect; styles 0.2-0.6 mm long; capsule stalks 0.8-2 mm long .... *S. scouleriana*

67. Twigs and leaf stalks long soft-hairy, the hairs appressed; styles 0.5-2 mm long; capsule stalks 0.2-0.8 mm long.

68. Stipules absent or rudimentary, sometimes leaflike but then not as prominent, tips shortly sharp-pointed; leaf stalks shallowly grooved above; female catkins on leafy twigs up to 5 mm long .... *S. planifolia*

68. Stipules leaflike, prominent, tips long tapering to a fine point; leaf stalks convex to flat above; female catkins on leafy twigs up to 2.5 mm long .... *S. pulchra*

66. Female catkins on distinct leafy twigs, flowering as the leaves emerge.

69. Floral bracts dark brown to blackish .... *S. lemmonii*

69. Floral bracts tawny or light brown.

70. Capsule stalks 2-5 mm long; styles 0.1-0.4 mm long; female catkins loosely flowered .... *S. bebbiana*

70. Capsule stalks 0-1.6 mm long; styles 0.2-1 mm long; female catkins compactly flowered.

71. Twigs and leaves smooth .... *S. raupii*

71. Twigs and leaves hairy.

72. Leaves, especially juvenile leaves, with rust-coloured hairs scattered on both surfaces .... *S. athabascensis*

72. Leaves lacking rust-coloured hairs.

73. Leaf stalks 3-27 mm long, yellowish; leaves 3-8 cm long; capsule stalks 0.4-2.8 mm long .... *S. glauca*

73. Leaf stalks 1.3-5 mm long, often reddish; leaves 1-4 cm long; capsule stalks 0-0.5 mm long.

74. Female catkins stout to globe-shaped, densely flowered, 5-33 mm long; floral bracts tawny; leaf margins flat .... *S. brachycarpa*

74. Female catkins usually slender but sometimes stout to nearly globe-shaped, moderately flowered, 11-55 mm long; floral bracts tawny, brown, or black; leaf margins slightly rolled under .... *S. niphoclada*

Salix alaxensis **(Andersson) Cov.** (*S. longistylis* Rydb. = var. *longistylis* [Rydb.] C. K. Schneider)

Alaska willow; felt-leaf willow

HABITAT/RANGE:

Wet meadows and thickets in the alpine and subalpine zones (var. *alaxensis*); moist to mesic talus slopes, forest openings, gravel floodplains, outwash fans, lakeshores and raw morainal deposits in the montane to alpine zones (var. *longistylis*); var. *alaxensis* frequent in N and EC BC; amphiberingian – N to AK, YT and NT and E to S AB, MB and PQ; E Asia; var. *longistylis* – N to AK, YT and W NT.

DESCRIPTION:

General: Dioecious shrubs or trees, 1-6 m tall, not colonial; branches erect, sometimes gnarled and semi-prostrate, flexible at base; twigs brownish, strongly glaucous or not, smooth or densely hairy.

Leaves: Alternate, simple, broadly oblong to elliptic to broadly egg-shaped, 5-11 cm long, 1-3.5 cm wide, lower surface long-soft-woolly, hairs white, upper surface dull, long soft-hairy to nearly smooth, margins entire or toothed, bases and tips pointed; leaf stalks without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins slender to stout, unstalked; floral bracts dark, hairs straight; stamens 2; ovaries 1, hairy; styles 1.3-2.8 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0-0.4 mm long.

Notes: Two varieties occur in BC:

1. Twigs not glaucous, densely hairy .... var. *alaxensis*
1. Twigs strongly glaucous, sparsely hairy or smooth .... var. *longistylis* (Rydb.) C. K. Schneider

Salix alba **L.** (*Salix alba* L. var. *vitellina* [L.] Stokes)

white willow

HABITAT/RANGE:

Moist to wet, usually riverine habitats; infrequent in S BC; introduced from Europe.

DESCRIPTION:

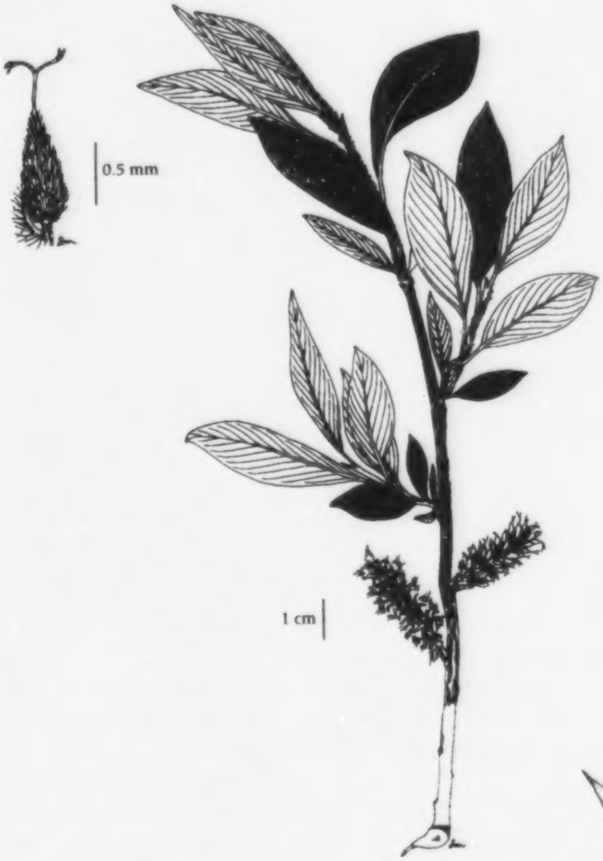
General: Dioecious trees, 10-25 m tall, not colonial; branches erect, flexible or somewhat brittle at base; twigs grey- to red-brown, or golden-yellow, densely hairy.

Leaves: Alternate, simple; narrowly oblong to lance-shaped, 6-12 cm long, 1-2 cm wide, lower surface glaucous, silky to nearly smooth, hairs white, upper surface dull, silky to nearly smooth, margins toothed, base pointed to wedge-shaped, tips pointed to tapering; leaf stalks with glandular dots or lobes at top; stipules leaflike.

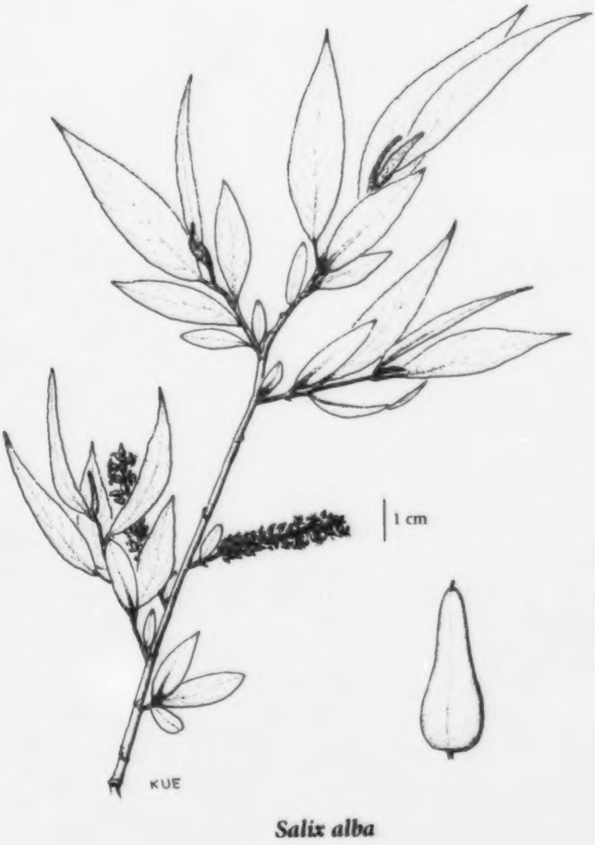
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins slender, on leafy twigs; floral bracts pale, hairs straight, female bracts deciduous; stamens 2; ovaries 1, smooth; styles 0.16-0.44 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.2-0.8 mm long.

Notes: Cultivated throughout North America. The most commonly cultivated form of this species, with golden-yellow, erect twigs, is *S. alba* var. *vitellina* (L.) Stokes. Plants with golden-yellow, weeping twigs are the hybrid *S.* x *sepulcralis* Simonk nothovar. *chrysocoma* (Dode) Meikle. Pure *S. babylonica* L. does not occur in BC. Reports of that species are based on *S.* x *sepulcralis* Simonk (*S. alba* x *S. babylonica*) or *S.* x *pendulina* Wenderoth (*Salix babylonica* x *S. fragilis* L.). The hybrid with *S. fragilis* (*S.* x *rubens*) is widely cultivated and naturalized in BC. See that hybrid for further comments.



Salix alaxensis var. *alaxensis*



Salix alba

Salix amygdaloides **Andersson**

peach-leaf willow

HABITAT/RANGE:

Moist to mesic floodplains and lakeshores in the steppe zone; rare in SC BC; E to PQ and S to PA, IN, MO, TX, NM, AZ, NV and OR.

DESCRIPTION:

General: Trees, 4-20 m tall, not colonial; branches erect, somewhat brittle at base; twigs yellowish to brown, smooth; bud scale margins free and overlapping.

Leaves: Alternate, simple; very narrowly elliptic to lance-shaped, 5.5-13 cm long, 2.5-4 cm wide, lower surface glaucous, smooth, upper surface dull, smooth or hairy, margins toothed, bases pointed to rounded, tips tapered or long tapering to a tail-like tip; leaf stalks with or without glandular dots at top, stipules rudimentary or leaflike on vigorous shoots.

Flowers: Unisexual, lacking sepals and petals; borne in catkins which flower as leaves emerge, the catkins slender, on leafy twigs; floral bracts pale, hairs wavy, female bracts deciduous; stamens 3-7; ovaries 1, smooth; styles 0.2-0.4 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 1.4-3.2 mm long.

Salix arbusculoides **Andersson**

northern bush willow; little-tree willow

HABITAT/RANGE:

Moist to mesic sedge fens, openings in spruce forests and lake shores in the montane and subalpine zones; common in N BC, rare in S BC; N to AK, YT and S NT and E to PQ.

DESCRIPTION:

General: Dioecious shrubs to trees, 1-6 m tall, not colonial; branches erect, flexible at base; twigs red-brown, smooth to sparsely hairy.

Leaves: Alternate, simple, very narrowly elliptic to elliptic, 4-8 cm long, 0.7-2 cm wide, lower surface glaucous, long-silky, hairs white and rust-coloured, upper surface highly glossy or shiny, smooth, margins toothed, bases and tips pointed; leaf stalks without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or just before, stout, unstalked, floral bracts pale or dark, hairs straight or wavy; stamens 2; ovaries 1, hairy; styles 0.3-0.5 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.6-0.9 mm long.

Salix arctica **Pall.** (*S. arctica* ssp. *crassijulis* [Trautv.] Hult., *S. arctica* ssp. *torulosa* [Trautv.] Hult.)

arctic willow

HABITAT/RANGE:

Mesic to dry meadows, slopes, ridges, heath and thickets in the subalpine and alpine zones; common to infrequent in mountains of BC except the Queen Charlotte Islands; circumpolar, N to AK, YT and NT, E to NF, S to MT, ID and OR; N Eurasia.

DESCRIPTION:

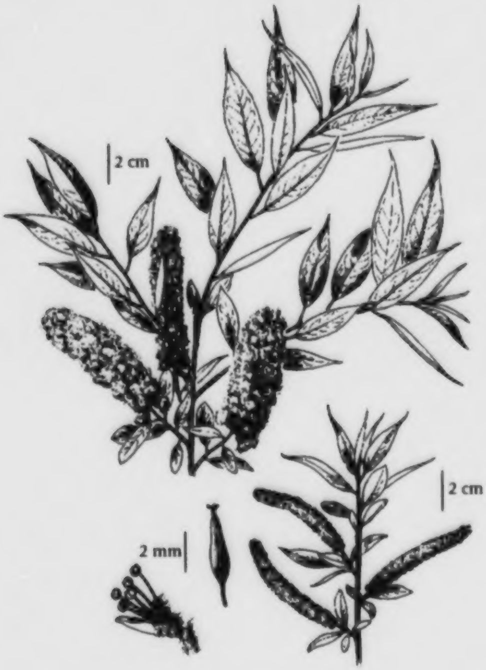
General: Dwarf shrubs, 3-25 (50) cm tall, layering; branches decumbent, trailing or ascending, flexible at base, sometimes strongly glaucous; twigs yellow-brown to violet, smooth.

Leaves: Alternate, simple, narrowly to broadly elliptic or narrowly to broadly egg-shaped, 1-8.5 cm long, 0.5-6 cm wide, lower surface glaucous, sparsely long soft-hairy or with a silky beard at tip, hairs white, upper surface shiny or dull, smooth or sparsely long soft-hairy near margin, margins entire, bases and tips pointed to rounded; leaf stalks without glandular dots at top; stipules absent, rudimentary, or, if leaflike, soon deciduous.

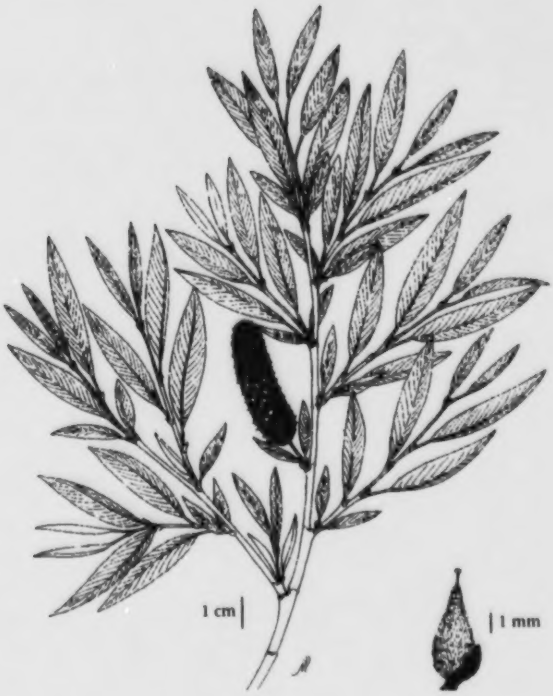
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins slender to nearly globe-shaped, on leafy twigs; floral bracts dark, hairs long and straight; stamens 2; ovaries 1, hairy; styles 0.6-2.2 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.2-1.6 mm long.

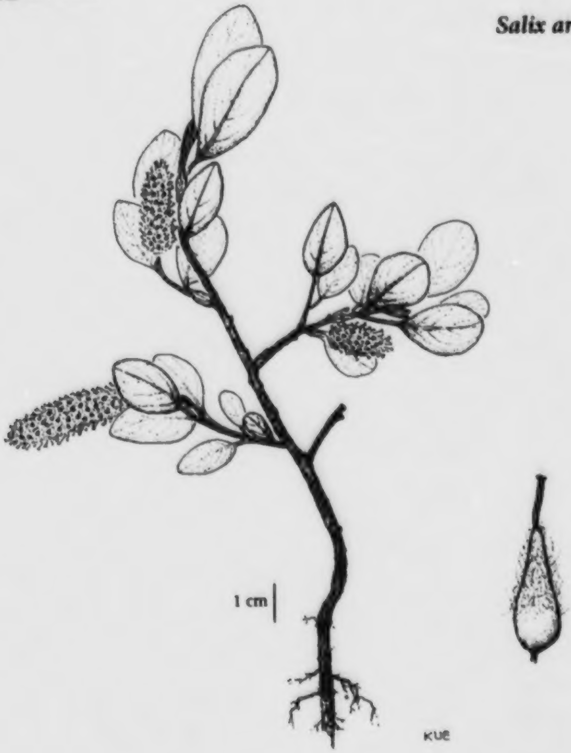
Notes: The southern Rocky Mountain species, *S. petrophila* Rydb. has been segregated out of *S. arctica* in this treatment. For separation of these taxa see Table 1, page 60.



Salix amygdaloides



Salix arbusculoides



Salix arctica

Salix athabascensis **Raup**

Athabasca willow

HABITAT/RANGE:

Moist to wet fens, muskegs and bogs in the montane zone; infrequent in N and EC BC; N to E AK, S YT and S NT and E to N MB.

DESCRIPTION:

General: Dioecious shrubs, 0.6-1.3 m tall, not colonial; branches erect, flexible at base; twigs red-brown, hairy.

Leaves: Alternate, simple, oblong, elliptic or lance- to egg-shaped, 2-5 cm long, 1-2 cm wide; lower surface glaucous, nearly smooth, hairs white, upper surface dull or shiny, smooth or sparsely long soft-hairy to nearly smooth, margins entire or glandular-dotted, bases rounded to pointed, tips pointed; leaf stalks without glandular dots at top; stipules rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts pale, hairs wavy; female bracts persistent; stamens 2; ovaries 1, hairy; styles 0.5-1 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.8-1.3 mm long.

Notes: This species commonly hybridizes with *S. pedicellaris*.

Salix barclayi **Andersson**

Barclay's willow

HABITAT/RANGE:

Moist to mesic thickets, fens, shores and forest openings from the steppe and montane to alpine zones; common throughout BC except Queen Charlotte Islands, rare on Vancouver Island; N to AK, S YT and W NT, E to AB and S to CO, ID and OR.

DESCRIPTION:

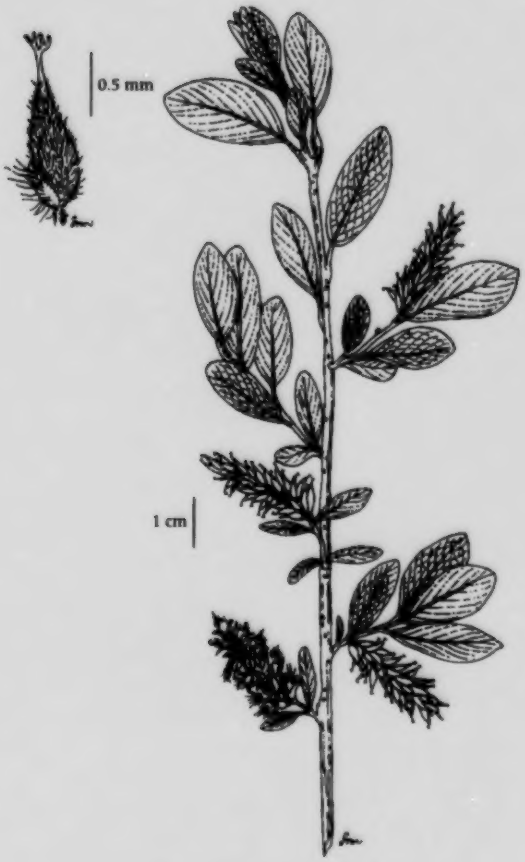
General: Dioecious shrubs, 1-3 m tall, not colonial; branches erect, flexible at base; twigs yellow-green to red-brown, hairy or smooth.

Leaves: Alternate, simple, oblong, elliptic or lance- to egg-shaped, 3-10 cm long, 1-5 cm wide, lower surface glaucous, smooth or sparsely long soft-hairy to nearly smooth, hairs white, upper surface shiny, smooth or sparsely long soft-hairy to nearly smooth, margins toothed, bases rounded, tips pointed to tapered; leaf stalks without glandular dots at top; stipules leaflike.

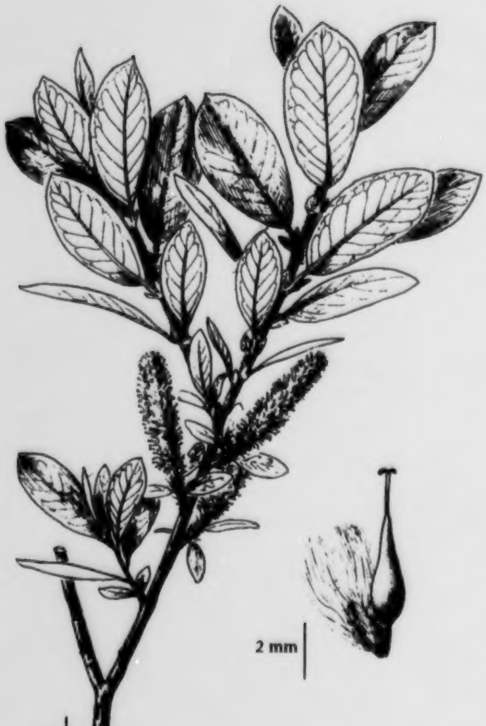
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts dark, hairs straight to curly; stamens 2; ovaries 1, smooth; styles 0.6-2.5 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.4-1.5 mm long.

Notes: Vegetative specimens of *Salix barclayi* are sometimes difficult to separate from *S. richardsonii* (see Table 3, page 60. This species hybridizes with *S. arctica*, *S. commutata*, *S. richardsonii* and *S. stolonifera*.



Salix athabascensis



Salix barclayi

Salix barrattiana Hooker

Barratt's willow

HABITAT/RANGE:

Moist to wet gravel bars, outwash fans and terraces, streambanks, shrub fens, thickets and meadows in the subalpine and alpine zones, often on limestone; common throughout BC east of the Coast-Cascade Mountains, except WC BC; N to AK, YT and W NT, E to AB and S to WY.

DESCRIPTION:

General: Dioecious shrubs, 0.3-1.5 m tall, not colonial; branches erect or decumbent, flexible at base; twigs red-brown to violet, coarsely and moderately hairy; buds and stipules oily.

Leaves: Alternate, simple, narrowly elliptic to lance- or egg-shaped, 3.5-9.5 cm long, 1-3 cm wide, lower surface not glaucous, long-silky-woolly, hairs white, upper surface shiny, sparsely long soft-hairy to nearly smooth, margins entire to toothed, bases pointed to rounded, tips pointed; leaf stalks without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins stout, unstalked; floral bracts dark, hairs straight; stamens 2; ovaries 1, hairy; styles 0.6-1.8 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.2-0.6 mm long.

Notes: The buds and stipules of this species are oily and emit a strong balsamic odour.

Salix bebbiana Sarg.

Bebb's willow; grey willow; long-beaked willow

HABITAT/RANGE:

Mesic to moist forests, thickets, swamps and clearings in the steppe and montane zones; common throughout BC east of the Coast-Cascade Mountains; N to AK, YT and NT, E to NF and S to NJ, NY, PA, IN, IA, NM, AZ and CA.

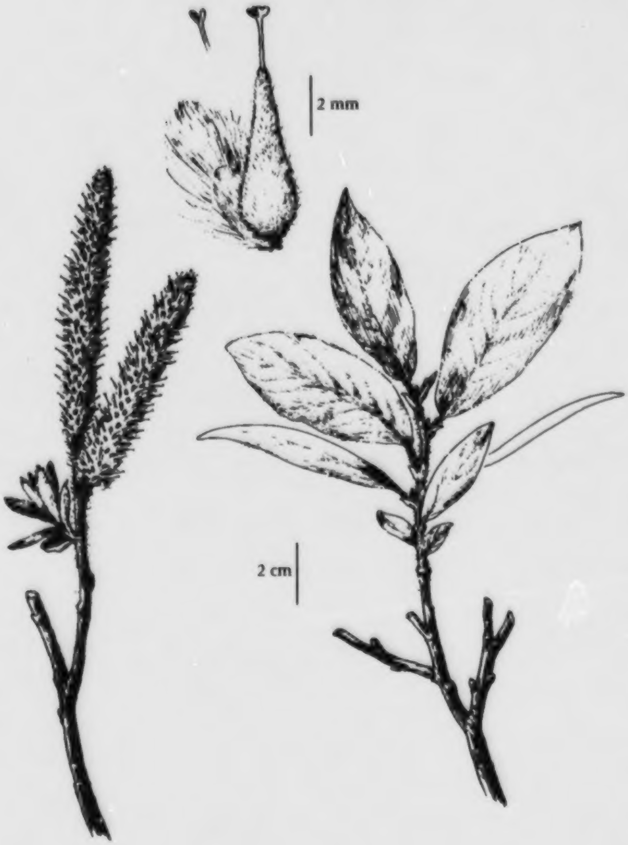
DESCRIPTION:

General: Dioecious shrubs to trees, 0.5-10 m tall, not colonial; branches erect, flexible or somewhat brittle at base; twigs red-brown, hairy, peeled wood prominently ridged.

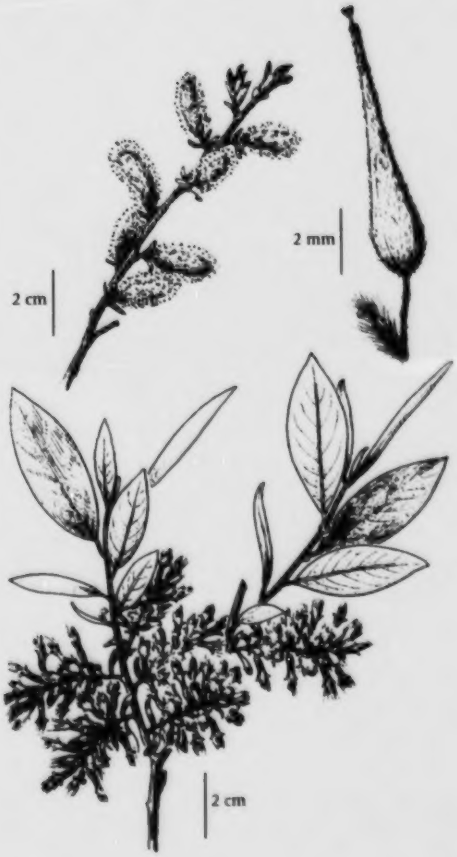
Leaves: Alternate, simple, narrowly elliptic to elliptic or egg-shaped, 2-8 cm long, 1-3 cm wide, lower surface glaucous, short-woolly to nearly smooth, hairs white, upper surface dull, short-silky to nearly smooth, margins entire to blunt-toothed, bases pointed, tips abruptly pointed; leaf stalks without glandular dots at top; stipules leaflike but soon lost.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or just before them, the catkins stout, unstalked or on leafy twigs; floral bracts pale, hairs straight or wavy; stamens 2; ovaries 1, hairy; styles 0.1-0.4 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 2-5 mm long.



Salix barrattiana



Salix bebbiana

Salix boothii **Dorn** (*S. pseudocordata auct. non* Andersson, *S. pseudomyrsinites auct. non* Andersson)

Booth's willow

HABITAT/RANGE:

Moist to wet streambanks and meadows in the montane and subalpine zones; rare in SC BC; E to AB and S to NM, AZ and CA.

DESCRIPTION:

General: Dioecious shrubs, 0.25-6 m tall, not colonial; branches erect, flexible at base; twigs yellowish to red-brown, smooth or sparsely hairy.

Leaves: Alternate, simple, narrowly oblong to broadly elliptic, 2.6-10 cm long, 0.8-3 cm wide, lower surface not glaucous, smooth, sparsely long soft-hairy, or short-silky, hairs white and rust-coloured, upper surface shiny to highly glossy, smooth or sparsely long soft-hairy to nearly smooth, margins entire to toothed, bases pointed to rounded, tips abruptly short-tapered; leaf stalks with or without glandular dots at the top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or just before them, the catkins stout, unstalked or on leafy twigs; floral bracts dark, hairs wavy or curly; stamens 2; ovaries 1, smooth; styles 0.3-1 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.5-2.5 mm long.

Notes: For a comparison with the similar *S. myrtillifolia* and *S. pseudomyrsinites* see Table 2, page 60.

Salix brachycarpa **Nutt.**

short-fruited willow; small-fruit willow

HABITAT/RANGE:

Moist to mesic open forests, thickets, fens, seepage on limestone shores, and gravel floodplains in montane and subalpine zones; common throughout BC (except WC area) E of the Coast-Cascade Mountains; N to S YT and W NT, E to PQ and S to NM and CA.

DESCRIPTION:

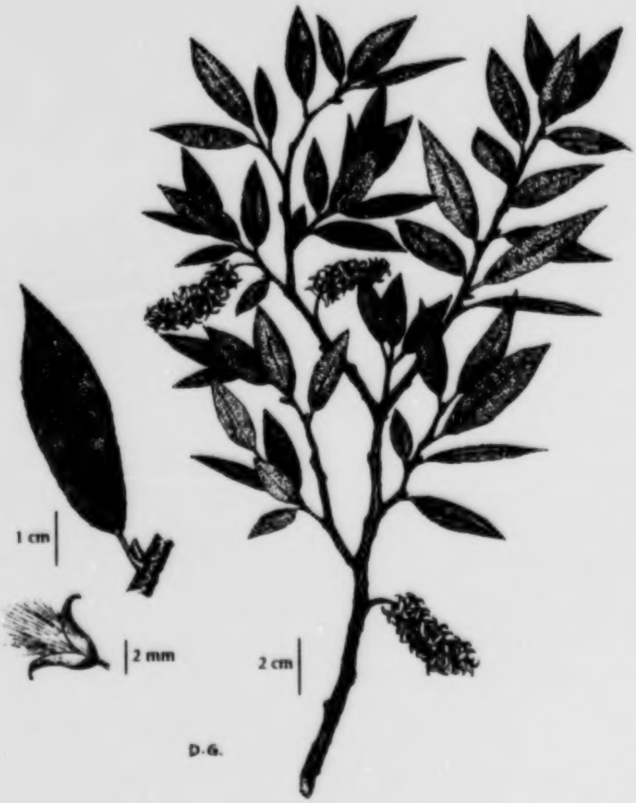
General: Dioecious shrubs, 0.2-1.5 m tall, not colonial; branches decumbent or erect, flexible at base; twigs red-brown, densely hairy.

Leaves: Alternate, simple; narrowly oblong to egg-shaped, 1-4 cm long, 0.5-1.6 cm wide, lower surface glaucous, long soft-hairy or long-silky, hairs white, upper surface shiny, long soft-hairy to nearly smooth, margins entire, bases rounded to pointed, tips pointed; leaf stalks without glandular dots at top; stipules rudimentary or leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout to globe-shaped, on leafy twigs; floral bracts pale, hairs wavy or straight; stamens 2; ovaries 1, hairy; styles 0.5-1.5 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0-0.5 mm long.

Notes: The taxon, sometimes treated as *S. brachycarpa* ssp. *niphoclada*, is treated as *S. niphoclada* in this work. See the latter species for further discussion. Putative hybrids with *S. glauca* var. *villosa* have been reported.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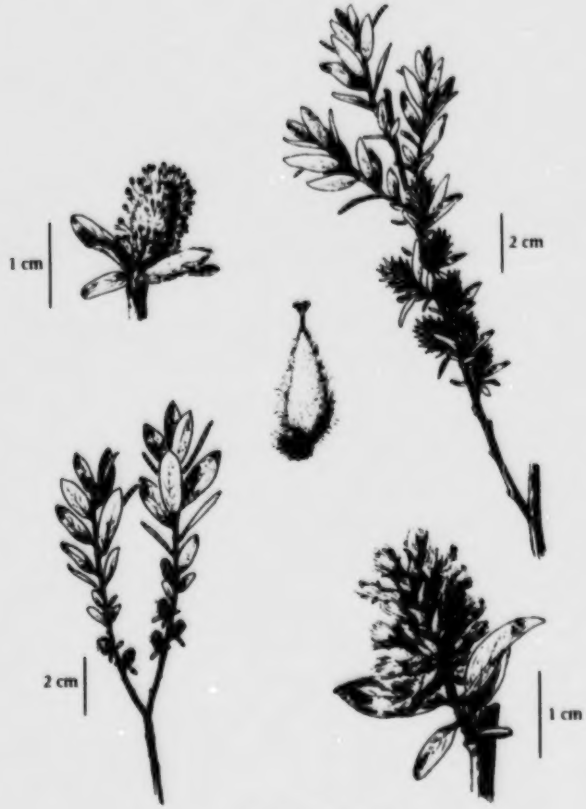
Salix boothii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Salix brachycarpa

Salix candida **Fluegge *ex* Willd.**

sage willow; hoary willow; sage-leaf willow

HABITAT/RANGE:

Moist to wet floodplains, shores, marl bogs, thickets and meadows in the montane zone; common in S BC in and E of the Coast-Cascade Mountains, infrequent northward, absent in WC BC; N to E AK, S YT and S NT, E to NF and S to NJ, IL, PA, IN, IA, SD, CO, ID and WA.

DESCRIPTION:

General: Dioecious shrubs, 0.3-1 m tall, layering; branches erect, flexible at base; twigs yellow- to grey-brown, densely hairy.

Leaves: Alternate, simple, strap-shaped to lance-shaped, 4.7-10 cm long, 0.5-2 cm wide, lower surface glaucous, densely woolly, hairs white, upper surface dull or shiny, sparsely hairy or woolly, margins entire to toothed, bases and tips pointed; leaf stalks without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge tor just before them, the catkins stout, unstalked or on leafy twigs; floral bracts pale or dark, hairs straight; stamens 2; ovaries 1, hairy; styles 0.3-1.9 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.1-1.2 mm long.

Notes: This species hybridizes with both *S. myrtillifolia* and *S. petiolaris*.

Salix cascadensis **Cockerell** (*S. cascadensis* var. *thompsonii* Brayshaw)

Cascade willow

HABITAT/RANGE:

Mesic to dry rocky slopes, ridges, fellfields and meadows in the high subalpine and alpine zones; infrequent in SC BC; S to CO, UT, ID and WA.

DESCRIPTION:

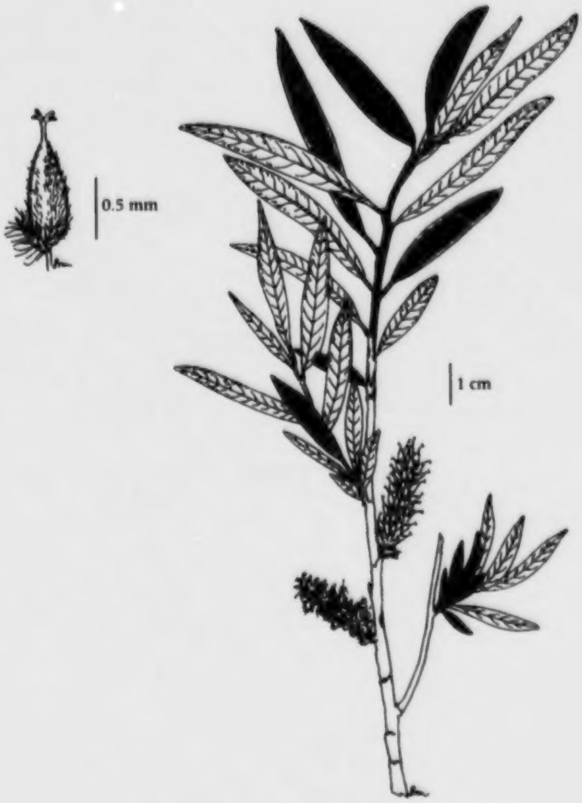
General: Dwarf shrubs, 1-4 cm tall, forming rhizomatous mats; branches erect, flexible at base; twigs yellowish, smooth.

Leaves: Alternate, simple, narrowly elliptic to elliptic, 9-26 mm long, 3.8-7.5 mm wide, lower surface glaucous, smooth or sparsely long soft-hairy, hairs white, upper surface shiny, smooth or sparsely long soft-hairy, margins entire, bases and tips pointed; leaf stalks without glandular dots at top; stipules absent.

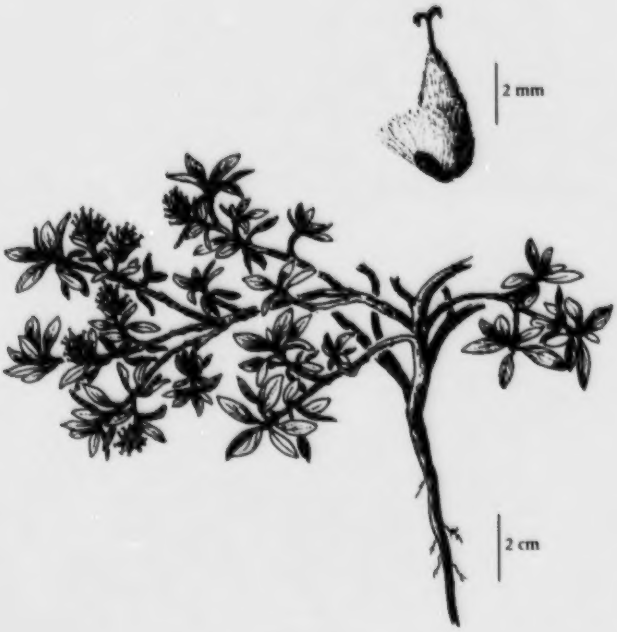
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts dark, hairs wavy or straight; stamens 2; ovaries 1, smooth or hairy; styles 0.3-1 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0-0.6 mm long.

Notes: A phase of this species with smooth ovaries has been named var. *thompsonii* Brayshaw. For a comparison of *S. cascadensis* with *S. arctica* and *S. petrophila* see Table 1, page 60.



Salix candida



Salix cascadensis

***Salix commutata* Bebb**

under-green willow

HABITAT/RANGE:

Wet to moist thickets, lakeshores, gravelly streambanks, floodplains, river terraces, open forests and raw morainal deposits in the subalpine to alpine zones; frequent throughout BC; N to AK and W NT, E to AB, S to MT, ID and OR.

DESCRIPTION:

General: Dioecious shrubs, 0.2-3 m tall, not colonial; branches erect, flexible at base; twigs yellowish to red-brown, sparsely to densely hairy.

Leaves: Alternate, simple, narrowly oblong to broadly elliptic, 1-10 cm long, 0.5-4.4 cm wide, lower surface not glaucous, smooth or short-woolly to long soft-hairy or nearly smooth, hairs white, upper surface dull, smooth or long soft-hairy to nearly smooth, margins entire to toothed, bases rounded to heart-shaped, tips pointed to tapered; leaf stalks without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts dark or pale, hairs straight or wavy; stamens 2; ovaries 1, smooth or rarely hairy; styles 0.5-1.5 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.3-2 mm long.

Notes: This species has been reported to hybridize with *S. barclayi*.

***Salix discolor* Muhlenb.**

pussy willow

HABITAT/RANGE:

Wet to moist thickets, swamps, fens, shores, streambanks, clearings and open forests in the montane zone; common throughout BC except NW BC; N to W NT, E to NF and S to NY, NC, IN, MO, SD and WY.

DESCRIPTION:

General: Dioecious shrubs, 2-6 m tall, not colonial; branches erect, flexible at base; twigs red-brown to yellowish, hairy or smooth.

Leaves: Alternate, simple, narrowly elliptic to egg-shaped, 3-14 cm long, 1-3.5 cm wide, lower surface glaucous, sparsely long soft-hairy to nearly smooth, hairs white and rust-coloured, upper surface dull or shiny, sparsely long soft-hairy to nearly smooth, margins entire to toothed, bases rounded to wedge-shaped, tips pointed; leaf stalks without glandular dots at top; stipules leaflike or rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins stout, unstalked; floral bracts dark, hairs straight; stamens 2; ovaries 1, hairy; styles 0.3-1 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 2-2.7 mm long.

***Salix drummondiana* J. Barratt *ex* Hook.** (*S. subcoerulea* Piper)

Drummond's willow

HABITAT/RANGE:

Wet to moist thickets, fens, swamps, streambanks, gravelly floodplains, clearings and open forests in the montane and subalpine zones; common throughout BC east of the Coast-Cascade Mountains; N to S YT and NT, E to SK and S to NM, UT, NV and CA.

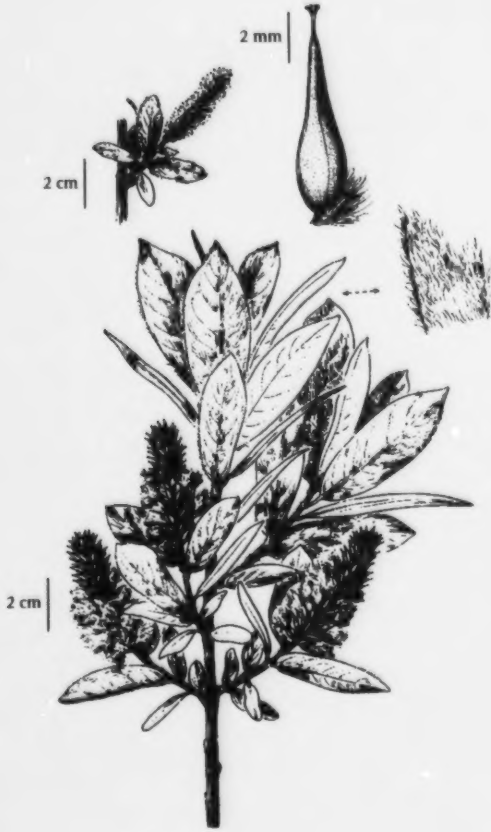
DESCRIPTION:

General: Dioecious shrubs, 1-5 m tall, not colonial; branches erect, brittle at base, strongly glaucous; twigs red- to yellow-brown, smooth to sparsely hairy.

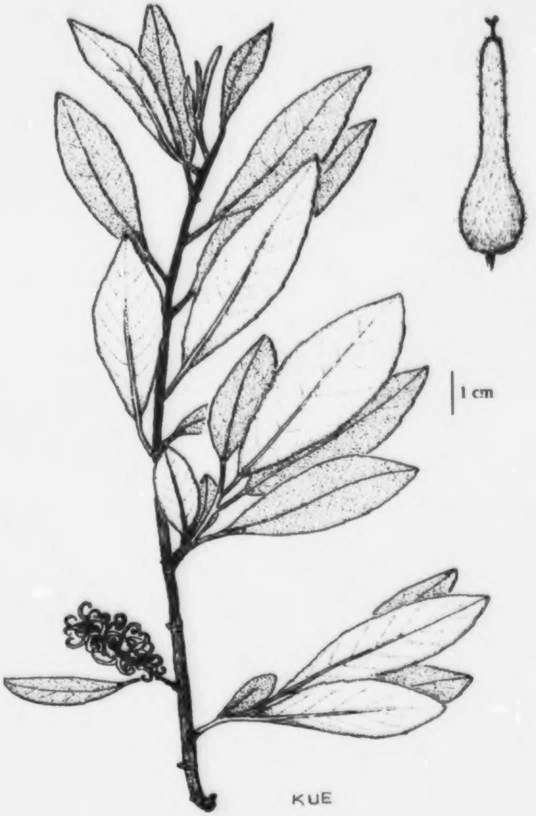
Leaves: Alternate, simple, strap- to lance-shaped, 4-9 cm long, 1-3 cm wide, lower surface very densely silky or short-woolly-silky, hairs white and rust-coloured, upper surface shiny or dull, silky to nearly smooth, margins entire to toothed, bases and tips pointed; leaf stalks without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins slender or stout, unstalked; floral bracts dark, hairs straight; stamens 2; ovaries 1, hairy; styles 0.5-1.5 mm long.

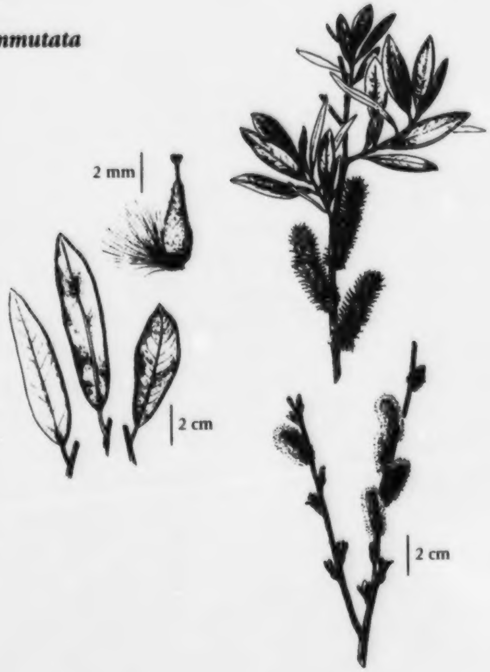
Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.3-2 mm long.



Salix commutata



Salix discolor



Salix drummondiana

Salix exigua **Nutt.** (*S. argophylla* Nutt. = ssp. *exigua*; *S. exigua* var. *pedicellaris* [Anderss.] Cronq., *S. interior* Rowlee = ssp. *interior* [Rowlee] Cronquist)

narrow-leaf willow; coyote willow (ssp. *exigua*); sandbar willow (ssp. *interior*)

HABITAT/RANGE:

Pioneer on mesic to moist, sandy or gravelly floodplains and sedge meadows in the steppe and montane zones; common in SE and SC BC, less common northward; ssp. *exigua* – E to SK and NB, S to TX, NM, AZ and CA; ssp. *interior* – N to AK, YT and NT, E to NB and S to VA, MS, LA, OK and CO.

DESCRIPTION:

General: Dioecious shrubs or trees, 0.5-6 m tall, forming colonies by root shoots; branches erect, flexible at base; twigs yellow- to red-brown, smooth or sparsely to densely hairy.

Leaves: Alternate, simple, linear to strap-shaped, 3-16 cm long, 0.2-1 cm wide; lower surface glaucous or not, silky or long soft-hairy to nearly smooth, hairs white, upper surface shiny, silky or long soft-hairy to nearly smooth, margins entire or remotely and minutely spiny-toothed, bases wedge-shaped, tips pointed to tapered; leaf stalks without glandular dots at top; stipules leaflike, rudimentary, or absent.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or throughout season, the catkins slender, on leafy twigs; floral bracts pale, hairs wavy or straight, female bracts deciduous; stamens 2; ovaries 1, smooth or hairy; styles 0-0.2 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.2-0.9 mm long.

Notes: Two subspecies occur in BC:

1. Leaves persistently silky-hairy, margins mostly entire; ovaries usually smooth; floral bract tips entire .... ssp. *exigua*

1. Leaves mostly smooth or nearly smooth when fully developed, margins minutely but prominently spiny-toothed; ovaries hairy to nearly smooth; floral bract tips irregularly jagged or toothed .... ssp. *interior* (Rowlee) Cronquist

Notes: The ranges of ssp. *exigua* and ssp. *interior* overlap in SE BC. The separation of the 2 in this region is problematic.

Salix farriae **C. R. Ball** (*S. hastata* var. *farriae* [C. R. Ball] Hult.)

Farr's willow

HABITAT/RANGE:

Wet to moist meadows and streambanks in the montane and subalpine zones; infrequent in SE BC; E to AB and S to WY, ID and WA.

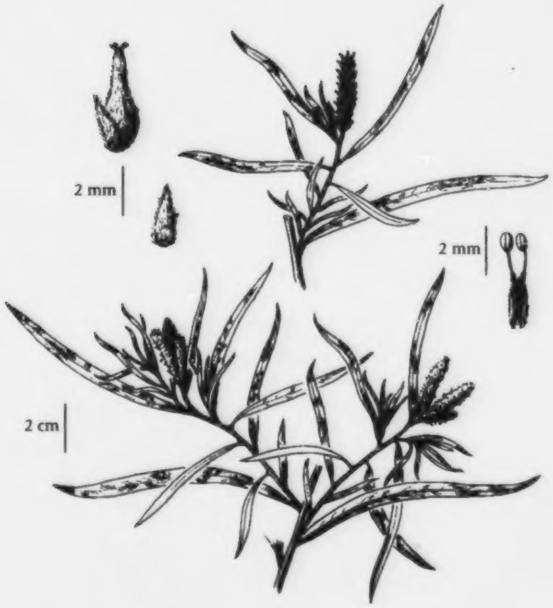
DESCRIPTION:

General: Dioecious shrubs, 0.2-1.5 m tall, not colonial; branches erect, flexible at base; twigs yellow- to red-brown, smooth to sparsely hairy.

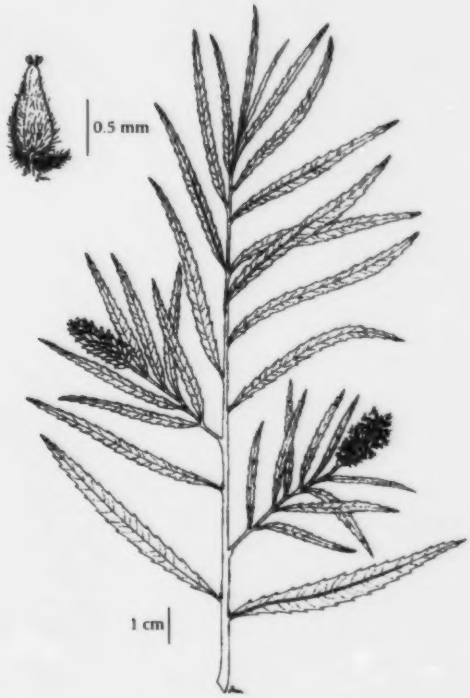
Leaves: Alternate, simple, narrowly elliptic to elliptic, 2-7.5 cm long, 0.8-3.5 cm wide, lower surface glaucous, smooth, upper surface shiny or dull, smooth or minutely hairy on midrib, margins entire to toothed, bases rounded, tips pointed; leaf stalks without glandular dots at top; stipules leaflike or rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts dark, smooth or hairy, hairs wavy; stamens 2; ovaries 1, smooth; styles 0.3-1.2 mm long.

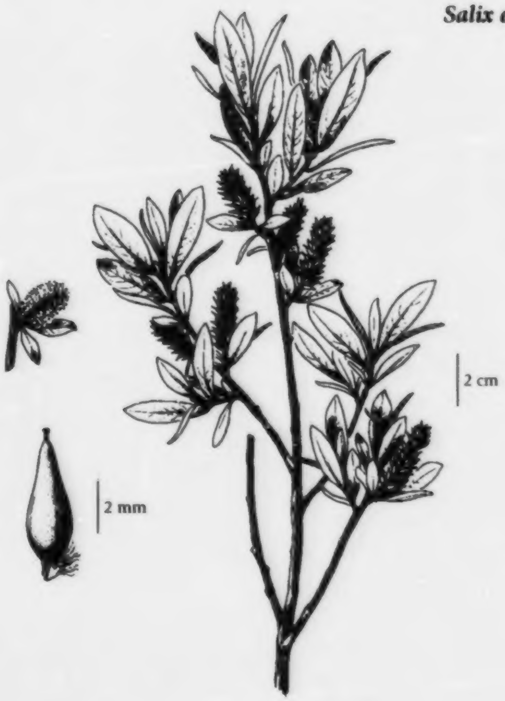
Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.3-1.5 mm long.



Salix exigua ssp. *exigua*



Salix exigua ssp. *interior*



Salix farriae

***Salix geyeriana* Andersson** (*S. geyeriana* var. *meleina* J.K. Henry)

Geyer's willow

HABITAT/RANGE:

Wet to moist streamsides, lakeshores and sedge meadows in the lowland, steppe and montane zones; infrequent in S BC; S to NM, AZ and CA.

DESCRIPTION:

General: Dioecious shrubs, 1-5 m tall, not colonial; branches erect, flexible at base, strongly glaucous or not; twigs yellowish to violet, smooth or hairy.

Leaves: Alternate, simple, strap-shaped to narrowly elliptic, 3-7.5 cm long, 0.7-1.4 cm wide, lower surface glaucous, silky to nearly smooth, hairs white and rust-coloured, upper surface shiny, silky to nearly smooth, margins entire, bases and tips pointed; leaf stalks without glandular dots at top; stipules absent.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, or just before them, more or less globe-shaped, on leafy twigs; floral bracts pale, smooth or hairy, hairs wavy or straight; stamens 2; ovaries 1, hairy; styles 0.1-0.2 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 1-2.8 mm long.

Notes: Vegetative plants of this species are sometimes difficult to distinguish from *S. petiolaris*. The branches of *S. geyeriana* do not always show the characteristic glaucousness, especially on Vancouver Island and the branches of *S. petiolaris* are sometimes sparsely glaucous.

***Salix glauca* L.**

grey-leaved willow

HABITAT/RANGE:

Wet to mesic thickets, fens, swamps, streambanks and forest openings from the montane to alpine zones; common throughout BC east of the Coast-Cascade Mountains (var. *villosa*) and locally frequent (var. *acutifolia*) in NW BC; circumpolar, var. *acutifolia* - N to AK and NT, var. *villosa* - N to YT and NT, E to NF, S to UT, NM and WA; Greenland, Eurasia.

DESCRIPTION:

General: Dioecious shrubs, 0.3-3 (-6) m tall, not colonial, erect or decumbent; branches erect, flexible at base; twigs red- to yellow-brown, sparsely to densely hairy.

Leaves: Alternate, simple, narrowly elliptic to lance- to egg-shaped, 3-8 cm long, 1-4 cm wide, lower surface glaucous, long soft-woolly, silky or sparsely long soft-hairy, often becoming nearly smooth, hairs white, upper surface shiny, long soft-hairy or sparsely long soft-hairy to nearly smooth, entire, bases pointed to rounded, tips pointed; leaf stalks without glandular dots at top; stipules leaflike or rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts pale, hairs wavy; stamens 2; ovaries 1, hairy; styles 0.3-1.4 mm long.

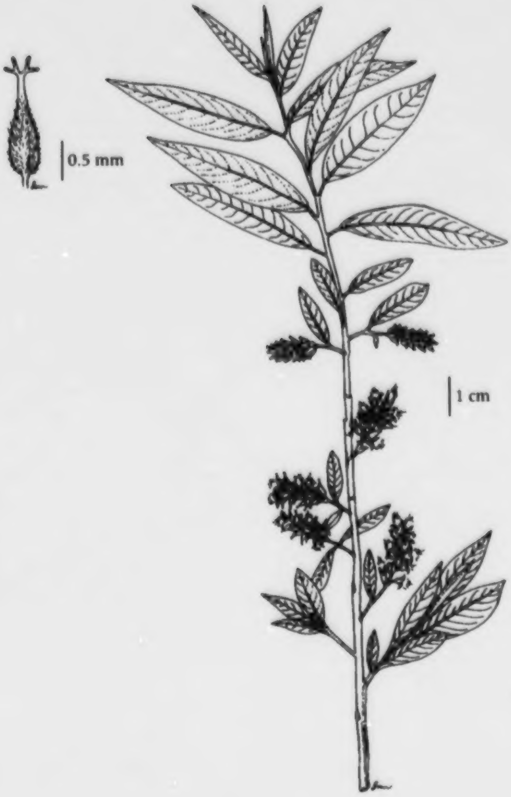
Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.3-2.8 mm long.

Notes: Two varieties occur in BC:

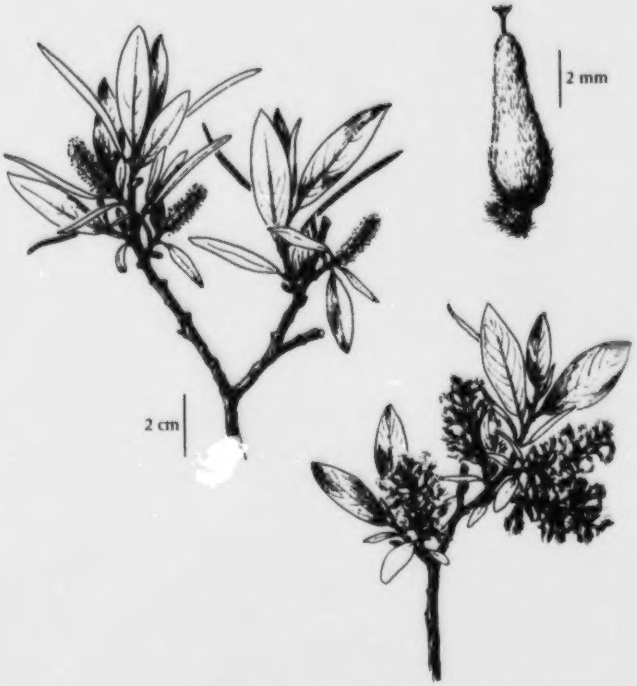
1. Lower surface of leaves usually nearly smooth or sparsely hairy with straggly hairs, stipules 0.3-4 (rarely 8) mm long, usually soon deciduous; female catkins 1.6-5.5 (rarely 6.5) cm long .... var. *villosa* (Hook.) Andersson

1. Lower surface of leaves clothed with long, straight, silky hairs; stipules 4-13 mm long, narrowly elliptic, often persistent more than 1 year; female catkins 3.5-8 cm long.......... var. *acutifolia* (Hook.) C. Schneider

Notes: The varieties *villosa* and *acutifolia* intergrade in northern BC where they overlap in the Haines Road region. They both sometimes appear to hybridize with *S. arctica*.



Salix geyeriana



Salix glauca var. *villosa*

***Salix hookeriana* J. Barratt ex Hook.** (*S. amplifolia* Cov., *S. piperi* Bebb)

Hooker's willow; coastal willow

HABITAT/RANGE:

Swamps, lakeshores and moist interdunal depressions; common in coastal SW BC and the Queen Charlotte Islands; N to S AK and S to N CA.

DESCRIPTION:

General: Dioecious shrubs or trees, 0.6-8 m tall, not colonial; branches erect, flexible at base; twigs yellow- to red-brown, smooth or densely hairy.

Leaves: Alternate, simple, elliptic to lance- or broadly egg-shaped, 3.6-11 cm long, 2-6.3 cm wide, lower surface glaucous, long soft-hairy or short-woolly to shaggy-hairy, sometimes nearly smooth, hairs white and rust-coloured, upper surface highly glossy, long soft-hairy to nearly smooth, margins entire to toothed, bases and tips pointed to rounded; leaf stalks without glandular dots at top; stipules absent, rudimentary, or leaflike on vigorous shoots.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or before them, the catkins stout, unstalked; floral bracts dark, hairs straight or wavy; stamens 2; ovaries 1, smooth or hairy; styles 0.6-2.3 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.5-2 mm long.

Notes: The ovaries of this species may be smooth or hairy. The latter condition is more common in BC. The phase of the species with smooth ovaries, nearly smooth leaves and prominent stipules is sometimes named *S. piperi* Bebb.

***Salix lemmonii* Bebb**

Lemmon's willow

HABITAT/RANGE:

Streams, lakeshores and wet meadows; rare on SE Vancouver Island, known only from Rithet's Bog and Saanich Peninsula; S to CO, ID, NV and CA.

DESCRIPTION:

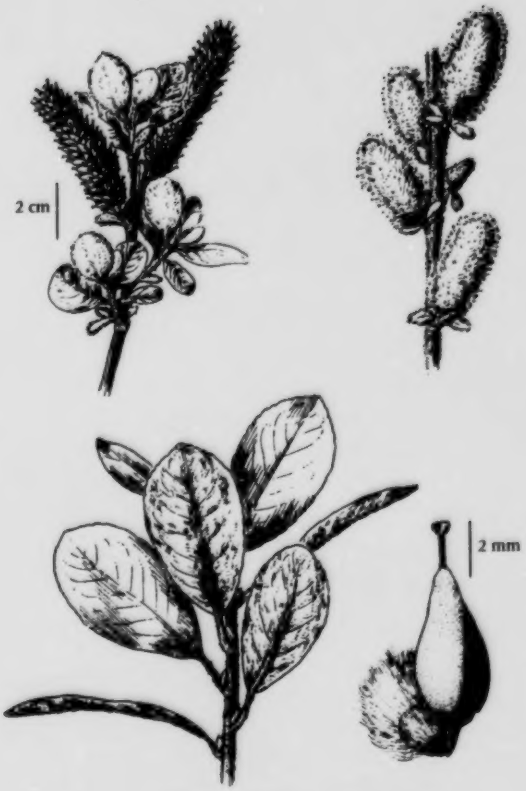
General: Shrubs, 1.2-4 m tall, not colonial; branches erect, flexible at base; sometimes strongly glaucous; twigs yellowish to red-brown, smooth or sparsely hairy.

Leaves: Alternate, simple, strap-shaped to narrowly elliptic, 4.4-11 cm long, 0.6-2.2 cm wide, lower surface glaucous, silky to nearly smooth, hairs white and rust-coloured, upper surface shiny, silky to nearly smooth, entire to toothed, bases and tips pointed; leaf stalks without glandular dots at top; stipules leaflike or rudimentary on early growth.

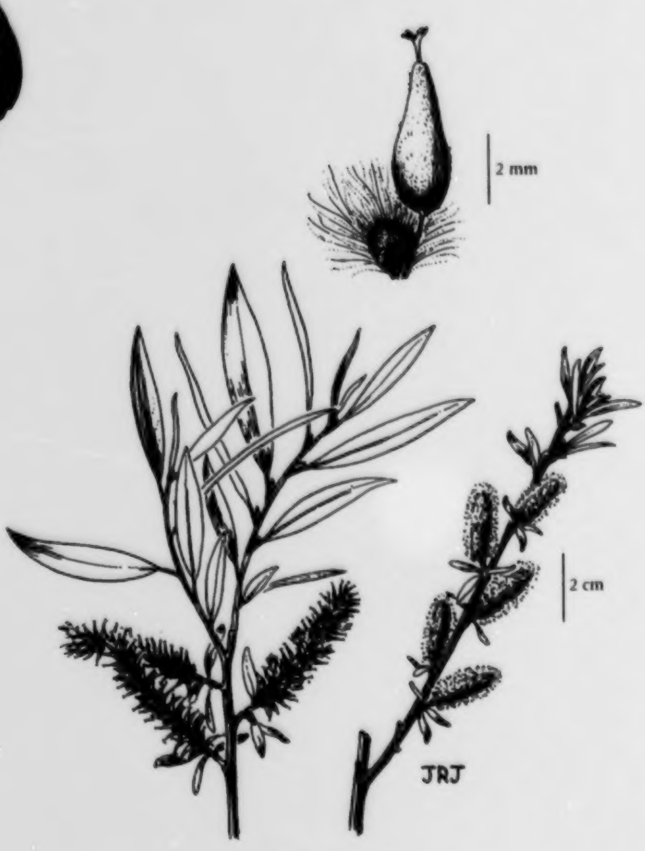
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or just before them, the catkins stout, on leafy twigs; floral bracts dark, hairs straight; stamens 2; ovaries 1, hairy; styles 0.3-1 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 1.1-2.1 mm long.

Notes: In the vicinity of Victoria this species grows with *S. geyeriana*. It may be separated from that species by catkins which are longer and cylindrical (versus nearly globe-shaped), longer styles (0.3-1 versus 0.1-0.2 mm long) and the presence of leaflike stipules or stipule scars (versus stipules absent or rudimentary).



Salix hookeriana



Salix lemmonii

Salix lucida **Muhl.** (*S. lasiandra* Benth. var. *caudata* [Nutt.] Sudw. = ssp. *caudata*, *S. lasiandra* var. *lasiandra* = ssp. *lasiandra*)

Pacific willow (var. *lasiandra*); **whiplash willow** (ssp. *caudata*)

HABITAT/RANGE:

Wet to mesic riverbanks, floodplains, shores, thickets and clearings in the lowland, steppe and montane zones; common throughout BC (ssp. *lasiandra*) and SC BC (ssp. *caudata*); ssp. *lasiandra* – N to AK, YT and NT, E to SK and S to NM, AZ and CA, ssp. *caudata* – N to AK and NT, E to AB and S to CO, UT, NV and CA.

DESCRIPTION:

General: Dioecious shrubs or trees, 1-11 m tall, not colonial; branches erect, flexible at base; twigs brownish, smooth or sparsely to densely hairy.

Leaves: Alternate, simple, narrowly elliptic to lance-shaped, 5-17 cm long, 1-3.5 cm wide, lower surface glaucous or not, long soft-hairy, hairs white and rust-coloured, upper surface shiny to highly glossy, smooth or becoming so, margins toothed, bases pointed to rounded, tips long and tail-like; leaf stalks with or without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins slender to stout, on leafy twigs; floral bracts pale, smooth or hairy, hairs wavy, female bracts deciduous; stamens 4-5; ovaries 1, smooth; styles 0.2-0.8 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.8-4 mm long.

Notes: Two subspecies occur in BC:

1. Leaves glaucous beneath, stomata usually restricted to the lower surface .... ssp. *lasiandra* (Benth.) E. Murray

1. Leaves not glaucous beneath, stomata abundant on both surfaces .... ssp. *caudata* (Nutt.) E. Murrray

Salix maccalliana **Rowlee**

MacCalla's willow

HABITAT/RANGE:

Wet to moist riverbanks, slough margins, marshes, fens and rocky slopes from the montane to subalpine zones; common in S BC east of the Coast-Cascade Mountains, rare northward; N to S YT and S NT, E to PQ and S to MN, ND and WA.

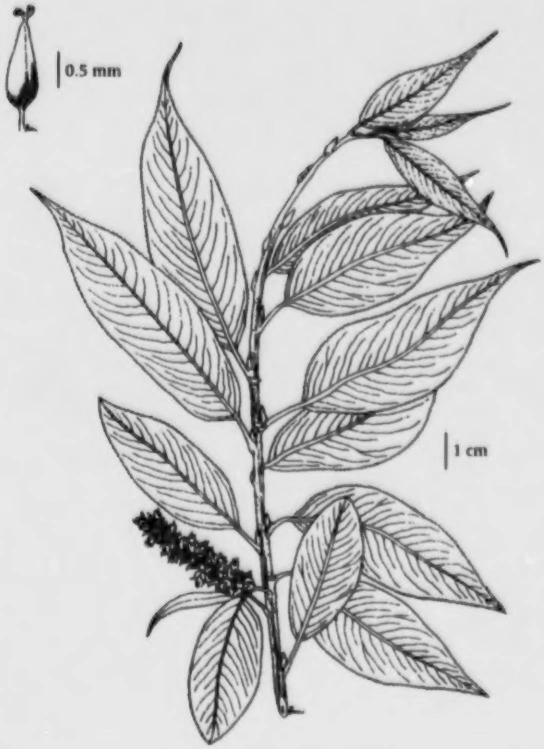
DESCRIPTION:

General: Dioecious shrubs, 1-5 m tall, not colonial; branches erect, flexible at base; twigs red- to yellow-brown, sparsely hairy or smooth.

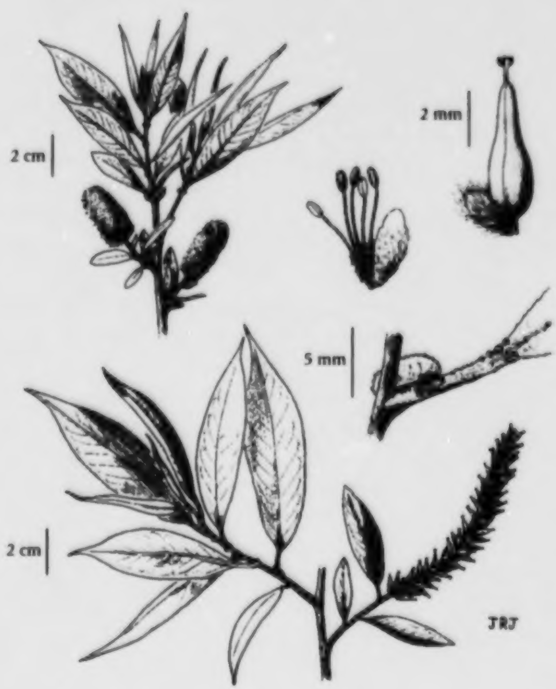
Leaves: Alternate, simple, strap-shaped to narrowly oblong, 4-8.5 cm long, 0.8-2.5 cm wide, lower surface not glaucous, smooth or hairy when young, hairs white and rust-coloured, upper surface highly glossy, smooth or hairy when young, margins toothed or entire, bases rounded to wedge-shaped, tips pointed; leaf stalks without glandular dots at top; stipules rudimentary or leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts pale, smooth or hairy, hairs wavy; stamens 2; ovaries 1, hairy; styles 0.8-1.2 mm long.

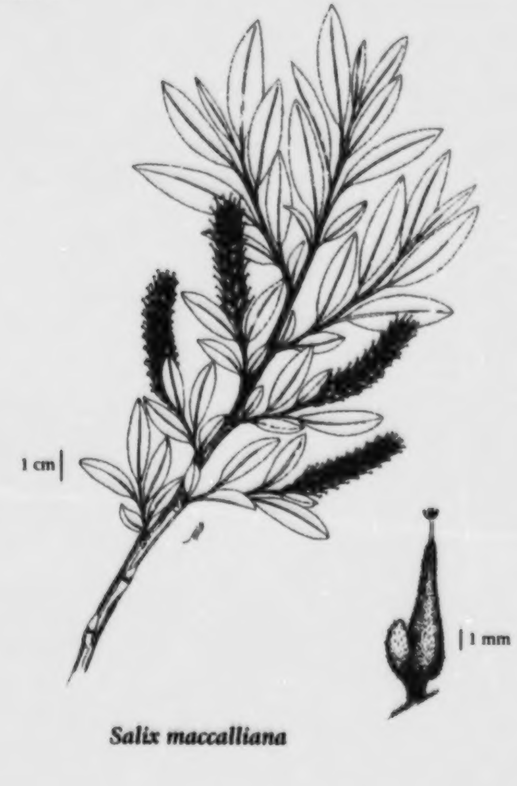
Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.8-2 mm long.



Salix lucida ssp. lasiandra


2 cm
2 mm
5 mm
2 cm
JRJ

Salix lucida ssp. caudata



Salix maccalliana

Salix melanopsis **Nutt.** (*S. exigua* ssp. *melanopsis* [Nutt.] Cronq.; *S. sessilifolia* var. *vancouverensis* Brayshaw)
dusky willow; dark sandbar willow

HABITAT/RANGE:

Pioneer on moist to mesic, sandy or gravelly floodplains of streams and rivers in the steppe and montane zones; infrequent in S BC, rare northward; E to AB and S to CO, UT, and CA.

DESCRIPTION:

General: Dioecious shrubs, 0.8-4 m tall, forming colonies by root shoots; branches erect, flexible at base; twigs gray-brown, smooth or sparsely to densely hairy.

Leaves: Alternate, simple, strap-shaped or narrowly oblong to narrowly elliptic, 3-8.5 cm long, 0.5-2 cm wide, lower surface glaucous or not, long soft-hairy to nearly smooth, hairs white, upper surface shiny, long soft-hairy to nearly smooth, margins usually minutely spiny-toothed, bases and tips pointed; leaf stalks without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or throughout season, the catkins slender, on leafy twigs; floral bracts pale, smooth or hairy, hairs wavy, female bracts deciduous; stamens 2; ovaries 1, smooth; styles 0.2-0.4 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.2-0.7 mm long.

Notes: *Salix melanopsis* and its long soft-hairy-leaved phase, which has been called *S. sessilifolia* var. *vancouverensis* Brayshaw, differ from *S. sessilifolia* in having shorter stigmas and nearly smooth or long soft-hairy rather than densely silky leaves.

Salix myrtillifolia **Andersson**
bilberry willow; blueberry willow

HABITAT/RANGE:

Deep moss in moist to wet muskeg, fens and lake and river shores; throughout BC east of the Coast-Cascade Mountains, common in N BC, infrequent in S BC; N to AK, YT and NT, E to ON, disjunct PQ, NB and NF and S to WY and CO.

DESCRIPTION:

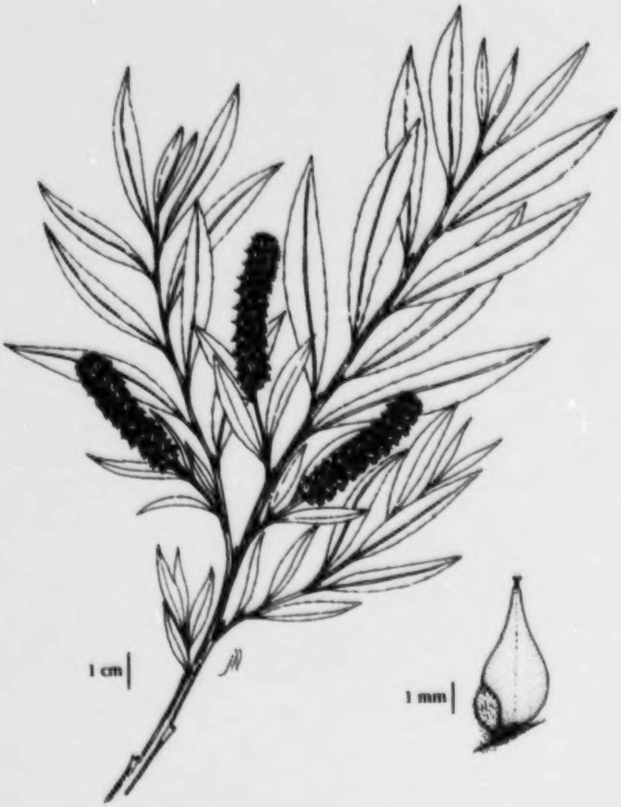
General: Dioecious shrubs, 0.1-0.6 m tall, layering; stems decumbent or erect, flexible at base; twigs yellow- to red-brown, sparsely hairy.

Leaves: Alternate, simple, narrowly elliptic to broadly egg-shaped, 1.7-6.2 cm long, 0.8-2.6 cm wide, lower surface not glaucous, smooth, upper surface shiny, smooth, margins blunt-toothed, bases and tips pointed to rounded; leaf stalks without glandular dots at top; stipules rudimentary, rarely leaflike.

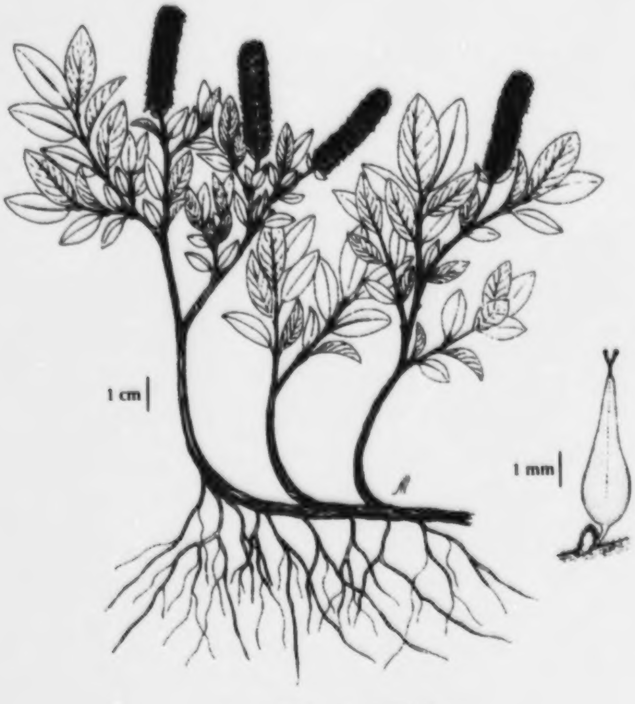
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts dark or pale, smooth or hairy, hairs straight or wavy; stamens 2; ovaries 1, smooth; styles 0.3-0.5 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.6-1.6 mm long.

Notes: A related taxon, which has been named *S. myrtillifolia* var. *cordata* (Andersson) Dorn, is treated here as *S. pseudomyrsinites* Andersson. See that species for comments. For a comparison with *S. pseudomyrsinites* and *S. boothii* see Table 2, page 60. *S. myrtillifolia* may hybridize with *S. candida*.



Salix melanopsis



Salix myrtillifolia

***Salix niphoclada* Rydb.** (*S. brachycarpa* ssp. *niphoclada* [Rydb.] Argus)

barren-ground willow; snow willow

HABITAT/RANGE:

Dry to mesic stony alpine slopes and saline flats; frequent in N BC; N to AK, YT and NT and disjunct in ON.

DESCRIPTION:

General: Dioecious shrubs, 0.3-1.5 m tall, not colonial; branches erect, decumbent, or trailing, flexible at base; twigs violet to yellow-brown, densely hairy.

Leaves: Alternate, simple, narrowly oblong to lanceolate or egg-shaped, 1.3-4.5 cm long, 0.5-1.5 cm wide, lower surface glaucous, long soft-hairy or woolly, hairs white, upper surface shiny, long soft-hairy, margins entire, bases rounded to wedge-shaped, tips pointed; leaf stalks without glandular dots at top; stipules rudimentary or leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, stout, on leafy twigs; floral bracts pale or dark, hairs wavy; stamens 2; ovaries 1, hairy; styles 0.2-0.8 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0-0.5 mm long.

Notes: This species has been treated as a subspecies of *S. brachycarpa*; but because the zone of overlap between the 2 taxa is very narrow and clear evidence of intergradation between them is not manifest they are treated here as species.

***Salix nivalis* Hook.** (*S. reticulata* ssp. *nivalis* [Hooker] Löve, Löve & Kapoor)

dwarf snow willow

HABITAT/RANGE:

Moist meadows, rocky slopes and fellfields in the alpine zone; common in S BC and E of the Coast-Cascade Mountains; E to AB and S to CO, UT, NV and CA.

DESCRIPTION:

General: Dwarf shrubs, 1-4 cm tall, forming rhizomatous mats; branches erect, flexible at base; twigs yellow- to red-brown, smooth or sparsely hairy.

Leaves: Alternate, simple, elliptic to broadly elliptic, 6-22 mm long, 4-15 mm wide, lower surface glaucous, smooth, upper surface shiny, smooth, margins entire, bases pointed to rounded, tips pointed, rounded, or notched; leaf stalks without glandular dots at top; stipules absent.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts pale, smooth; stamens 2; ovaries 1, hairy; styles 0.2-0.4 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0-0.8 mm long.

Notes: This species was previously treated as a subspecies of *S. reticulata*, but because the area of overlap between the two is small and evidence of intergradation between them is tenuous, it is now treated a separate species. The catkins are borne on flowering twigs that are as long as normal vegetative twigs.

***Salix pedicellaris* Pursh**

bog willow

HABITAT/RANGE:

Moist to wet bogs, fens and muskeg in the montane zone; frequent throughout BC east of the Coast-Cascade Mountains, except absent in NW BC; N to S YT and S NT, E to NF and S to NJ, NY, PA, IN, IA, ND, ID and OR.

DESCRIPTION:

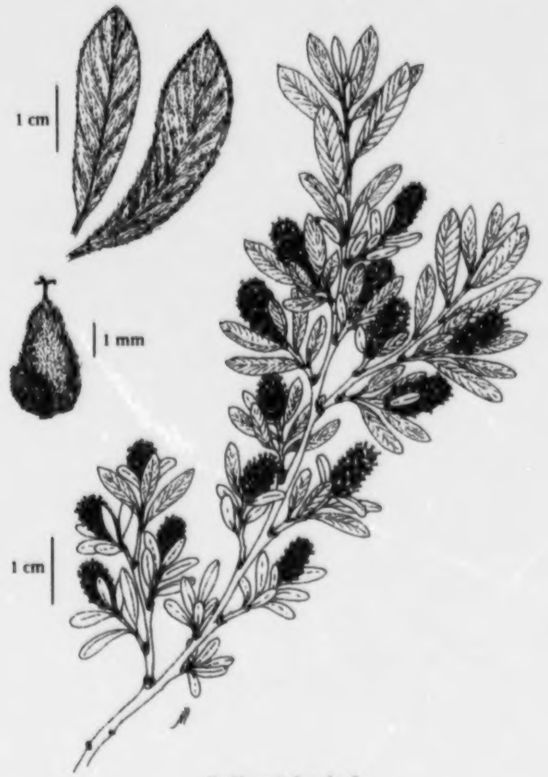
General: Dioecious shrubs, 0.2-1.5 m tall, spreading by layering; stems erect or decumbent, flexible at base; twigs yellow- to red-brown, smooth or sparsely hairy.

Leaves: Alternate, simple, narrowly oblong to elliptic or lance-shaped, 2-7 cm long, 0.5-2 cm wide, lower surface glaucous, smooth; upper surface dull, smooth, margins entire, bases and tips pointed to rounded; leaf stalks without glandular dots at top; stipules rudimentary.

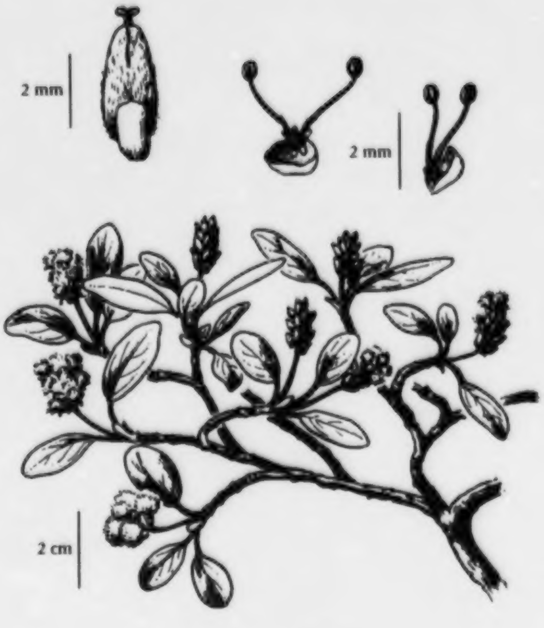
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts pale, smooth or hairy, hairs straight or wavy; stamens 2; ovaries 1, smooth; styles 0.1-0.2 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 2-3 mm long.

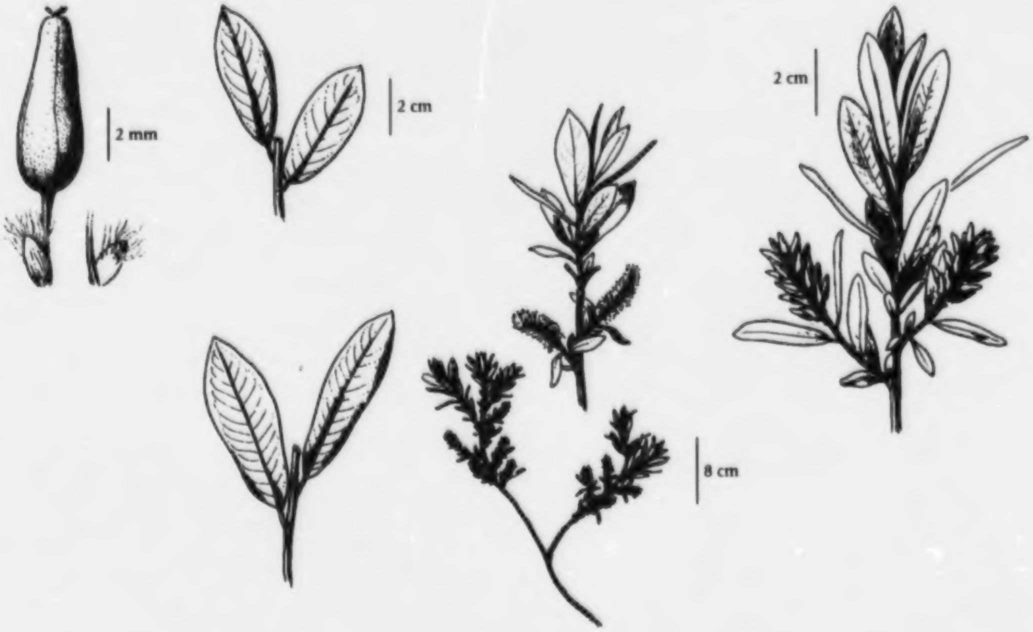
Notes: Hybrids between this species and *S. athabascensis* are common in northern BC.



Salix niphoclada



Salix nivalis


2 mm
2 cm
2 cm
8 cm

Salix pedicellaris

Salix petiolaris **Sm.** **(*S. gracilis* Andersson)**

meadow willow

HABITAT/RANGE:

Wet thickets in the lower montane zone; rare in N BC; N to S NT, E to NB and S to NJ, MO, CO and WA.

DESCRIPTION:

General: Dioecious shrubs, 1-6 m tall, not colonial; branches erect, flexible at base; twigs yellowish, sparsely to moderately hairy.

Leaves: Alternate, simple, strap-shaped or very narrowly elliptic, 4-11 cm long, 0.6-2 cm wide, lower surface glaucous, silky to nearly smooth, hairs white and rust-coloured, upper surface dull or shiny, smooth or hairy, margins entire to toothed, bases and tips pointed; leaf stalks without glandular dots at top; stipules absent or rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or just before them, the catkins stout, unstalked or on leafy twigs; floral bracts dark, hairs straight; stamens 2; ovaries 1, hairy; styles 0-0.3 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 1.5-4 mm long.

Notes: Entire-leaved forms of this species are sometimes difficult to separate from *S. geyeriana*. See the latter species for comments.

Salix petrophila **Rydb.** **(*S. arctica* Pall. var. *petraea* Andersson)**

Rocky Mountain willow

HABITAT/RANGE:

Mesic rocky slopes in the subalpine and alpine zones; common in S BC; E to S AB and S to NY, PA, IN, IL, IA, NE, CO and WA.

DESCRIPTION:

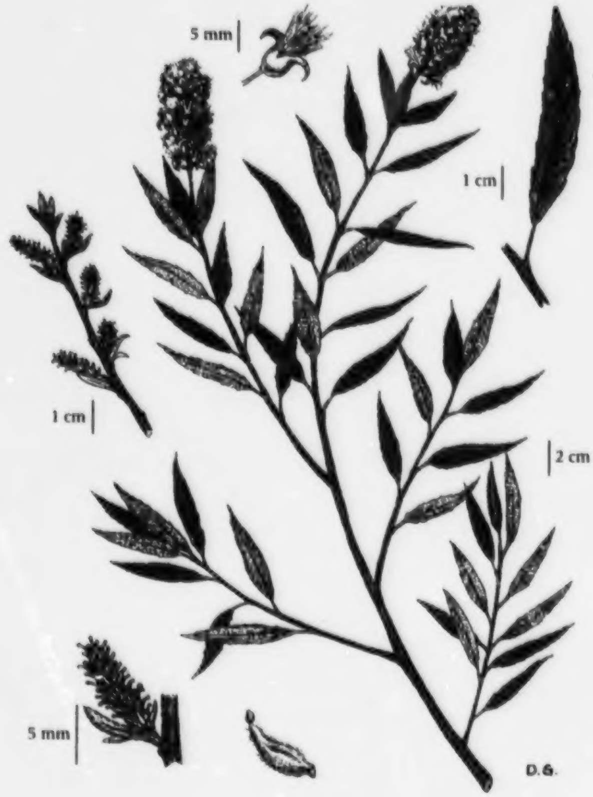
General: Dwarf shrubs, 2-10 cm tall, layering; branches decumbent or trailing, flexible at base; twigs yellowish, smooth or sparsely hairy.

Leaves: Alternate, simple, very narrowly elliptic to elliptic, lance- or egg-shaped, 2-4.4 cm long, 0.7-2 cm wide, lower surface glaucous, sparsely long soft-hairy to nearly smooth, hairs white, upper surface dull or shiny, long soft-hairy to nearly smooth, margins entire, bases and tips pointed to rounded; leaf stalks without glandular dots at top; stipules absent, rudimentary, or leaflike.

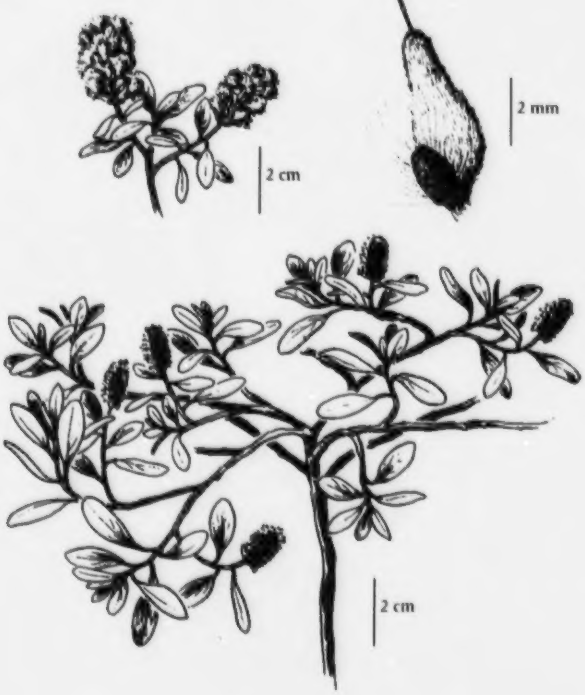
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts tawny to light brown, hairs straight or wavy; stamens 2; ovaries 1, hairy; styles 0.4-1.6 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.2-0.8 mm long.

Notes: This species is often included in *S. arctica* but it seems to be sufficiently distinct to warrant specific rank. Its exact distribution in S BC is not yet known. It sometimes has its filaments and anthers flushed with purple. For a separation from *S. arctica* and *S. cascadensis* see Table 1, page 60.


5 mm
1 cm
1 cm
2 cm
5 mm
D.G.

Salix petiolaris



Salix petrophila

***Salix planifolia* Pursh** (*S. phylicifolia* L. ssp. *planifolia* [Pursh] Hiitonen)

plane-leaved willow; tea-leaved willow

HABITAT/RANGE:

Moist to wet thickets, fens, swamps, forest openings, lake edges and stream banks in the montane and lower subalpine zones; common throughout BC east of the Coast-Cascade Mountains; N to AK, S YT and NT, E to NF and S to NH, ME, WI, MN, SD, NM, AZ and CA.

DESCRIPTION:

General: Dioecious shrubs, 0.15-4 m tall, not colonial; branches erect or decumbent, flexible at base; twigs yellow- to red-brown, smooth or sparsely to moderately hairy.

Leaves: Alternate, simple, narrowly oblong to elliptic or lance-shaped, 2-6.5 cm long, 0.5-2.3 cm wide, lower surface glaucous, smooth or sparsely silky, hairs white and rust-coloured, upper surface highly glossy, smooth or becoming so, margins entire or toothed, bases and tips pointed; leaf stalks without glandular dots at top; stipules absent, rudimentary, or leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins stout, unstalked; floral bracts dark, hairs straight; stamens 2; ovaries 1, hairy; styles 0.5-2 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.3-0.8 mm long.

Notes: The stipules of this species are usually rudimentary but sometimes appear as green or brownish leaflike lobes, 1-4.5 mm long and narrowly oblong or egg-shaped. They are sometimes persistent for 1 year. This species overlaps with and may intergrade with *S. pulchra* in N BC.

***Salix polaris* Wahlenb.**

polar willow

HABITAT/RANGE:

Moist late snowbed and snowflush areas and scree slopes in the upper subalpine and alpine zones; common in N BC; circumpolar, N to AK, YT and NT.

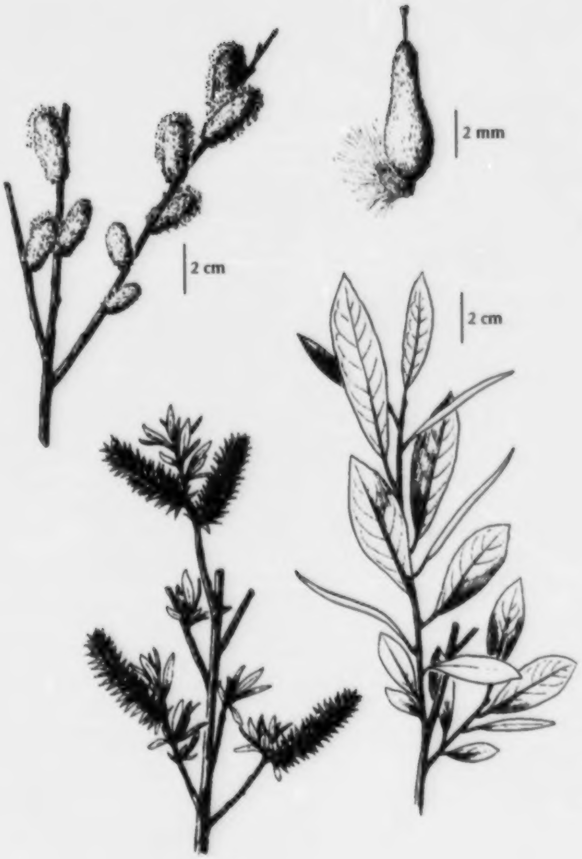
DESCRIPTION:

General: Dwarf shrubs, 1-9 cm tall, forming rhizomatous mats; branches erect, flexible at base, weakly to strongly glaucous; twigs brownish, smooth.

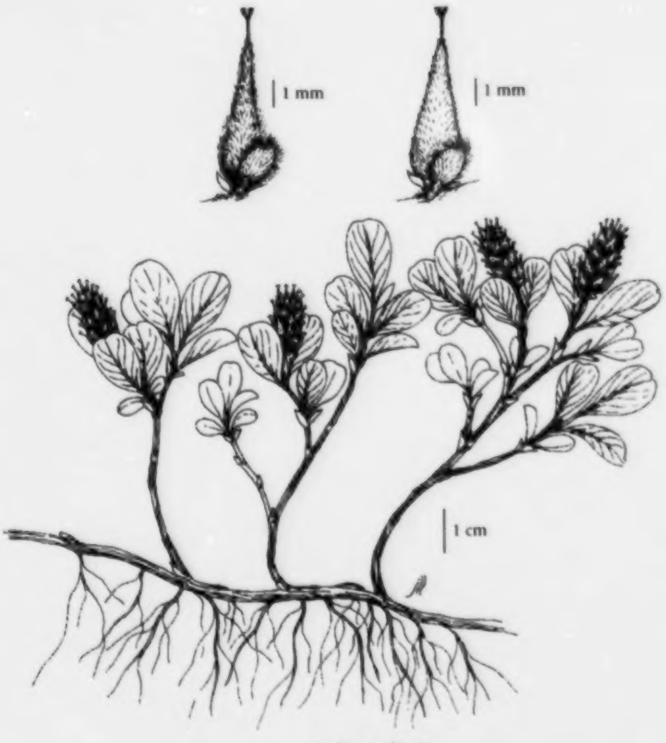
Leaves: Alternate, simple, elliptic to egg-shaped or nearly circular, 0.5-3.2 cm long, 0.8-1.8 cm wide, lower surface not glaucous, smooth or hairy, hairs white; upper surface shiny, smooth, margins entire, bases and tips pointed to rounded; leaf stalks without glandular dots at top; stipules absent or rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts dark, smooth or hairy, hairs straight or wavy; stamens 2; ovaries 1, hairy; styles 0.7-1.6 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.2-0.7 mm long.



Salix planifolia



Salix polaris

Salix prolixa **Andersson** (*S. eriocephala* Michx. var. *mackenzieana* [Hook.] Dorn, *S. mackenzieana* [Hook.] Barratt *ex* Andersson, *S. prolixa* Andersson, *S. rigida* Muhl. var. *mackenzieana* [Hook.] Cronq., *S. rigida* var. *macrogemma* [C. Ball] Cronq.)

Mackenzie willow

HABITAT/RANGE:

Moist forest openings, sand and gravel riverbars in the lowland, steppe and montane zones; common throughout BC; N to SE AK, S YT and NT, E to AB and S to WY, UT, NV and CA.

DESCRIPTION:

General: Dioecious shrubs, 1-5 m tall, not colonial; branches erect, flexible at base; twigs yellow- to red-brown, smooth or moderately hairy.

Leaves: Alternate, simple, lance- or egg-shaped to narrowly oblong, 5-15 cm long, 1-5.3 cm wide, lower surface glaucous, smooth, upper surface dull, smooth or sparsely long-hairy on midrib, margins toothed, bases rounded or heart-shaped, tips tapered; leaf stalks without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts dark, smooth or hairy, hairs wavy; stamens 2; ovaries 1, smooth; styles 0.3-1 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 1.3-4.2 mm long.

Notes: The twigs of this species are usually smooth, but plants with spreading-hairy twigs, the basis of the name *S. rigida* var. *macrogemma*, are common on Vancouver Island and are scattered elsewhere. Plants with hairy twigs are sometimes difficult to distinguish from *S. barclayi*.

Salix pseudomonticola **C.R. Ball** (*S. monticola auct. non* Bebb)

serviceberry willow; false mountain willow

HABITAT/RANGE:

Mesic to moist fens, thickets, forest edges and openings and floodplains in the montane to lower subalpine zones; infrequent in BC east of the Coast-Cascade Mountains; N to AK, S YT and S NT, E to Labr. and S to MN, SD, WY, ID and WA.

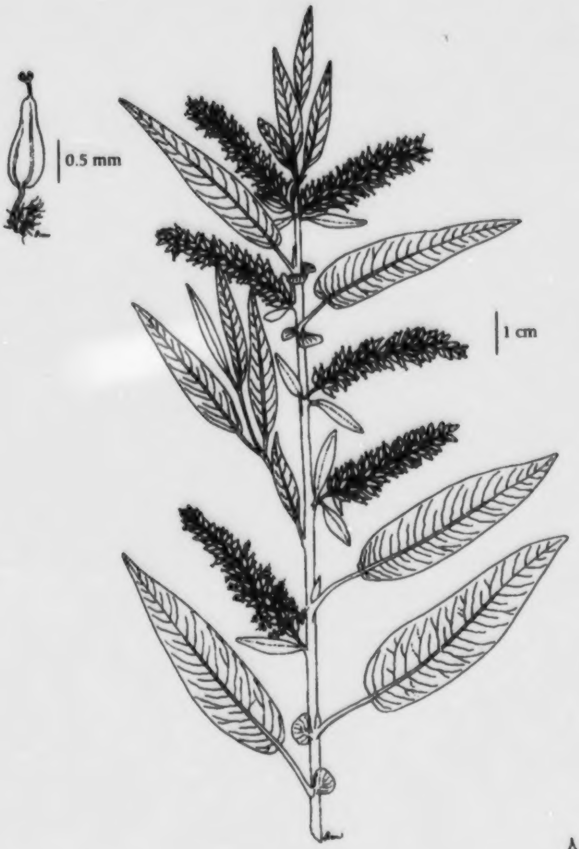
DESCRIPTION:

General: Dioecious shrubs, 1-6 m tall, not colonial; branches erect, flexible at base; twigs yellow-green, smooth or densely hairy.

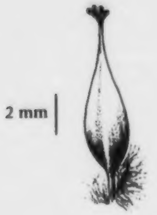
Leaves: Alternate, simple, elliptic to broadly egg-shaped, 2.5-10 cm long, 1.2-3.5 cm wide; lower surface glaucous, smooth or becoming so, hairs white, upper surface shiny or dull, smooth or midrib hairy, margins toothed or entire, bases rounded or nearly heart-shaped, tips pointed or subtapered; leaf stalks without glandular dots at top; stipules leaflike.

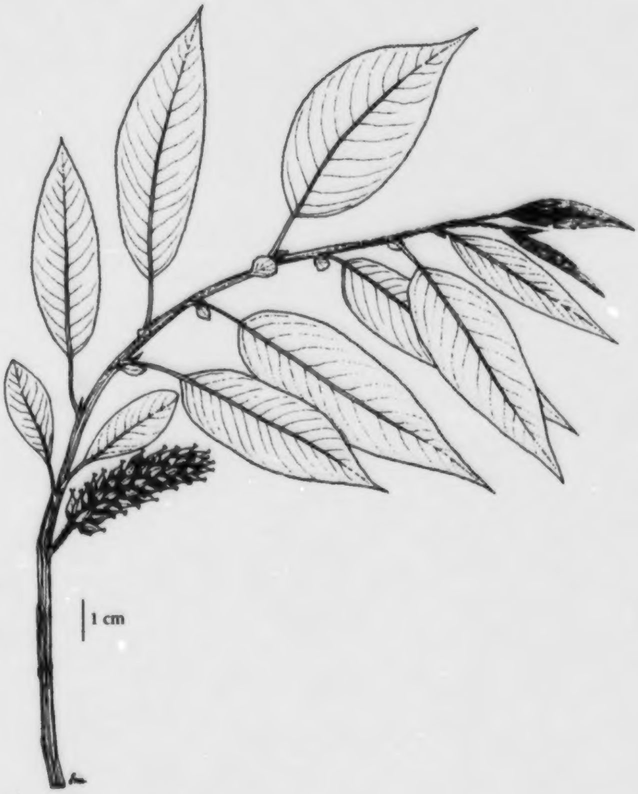
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins stout, unstalked; floral bracts dark, hairs straight; stamens 2; ovaries 1, smooth; styles 0.5-1.8 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.5-3 mm long.



Salix prolixa





Salix pseudomonticola

Salix pseudomyrsinites **Andersson** (*S. novae-angliae auct. non* Andersson, *S. myrtillifolia* var. *pseudomyrsinites* [Andersson] C. Ball, *S. myrtillifolia* var. *cordata* [Andersson] Dorn)

tall blueberry willow

HABITAT/RANGE:

Wet to moist lakeshores, rivers, thickets, open forests and muskeg (rarely) in the montane zone; infrequent in BC east of the Coast-Cascade Mountains; N to AK, YT and NT and E to ON.

DESCRIPTION:

General: Dioecious shrubs, 1-7 m tall, not colonial; branches erect, flexible at base; twigs yellow- to red-brown, sparsely to densely hairy.

Leaves: Alternate, simple, oblong to elliptic, lance- or egg-shaped, 3-11 cm long, 1-5 cm wide, lower surface not glaucous, sparsely long soft-hairy or becoming smooth, hairs white and rust-coloured; upper surface shiny, smooth or midrib moderately hairy, margins toothed or entire, bases wedge-shaped to rounded or heart-shaped, tips pointed to rounded; leaf stalks without glandular dots at top; stipules leaflike or rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts dark to pale, smooth or hairy, hairs wavy or curly; stamens 2; ovaries 1, smooth; styles 0.4-1.6 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.8-1.4 mm long.

Notes: This tetraploid taxon is specifically distinct from the related diploid, *S. myrtillifolia*. It may be distinguished by its tall growth form, usually hairy leaves, longer styles and its occurrence in upland forests and the shores of lakes and rivers. For a comparison with *S. myrtillifolia* and *S. boothii* see Table 3, page 60.

Salix pulchra **Cham.** (*S. phylicifolia* ssp. *pulchra* [Cham.] Hult., *S. planifolia* ssp. *pulchra* [Cham.] Argus, *S. planifolia* var. *yukonensis* [C. Schneider] Argus)

diamond-leaved willow

HABITAT/RANGE:

Moist thickets, shorelines and meadows in the subalpine zone; infrequent in NW BC; amphiberingian, N to AK, YT and NT; E Asia.

DESCRIPTION:

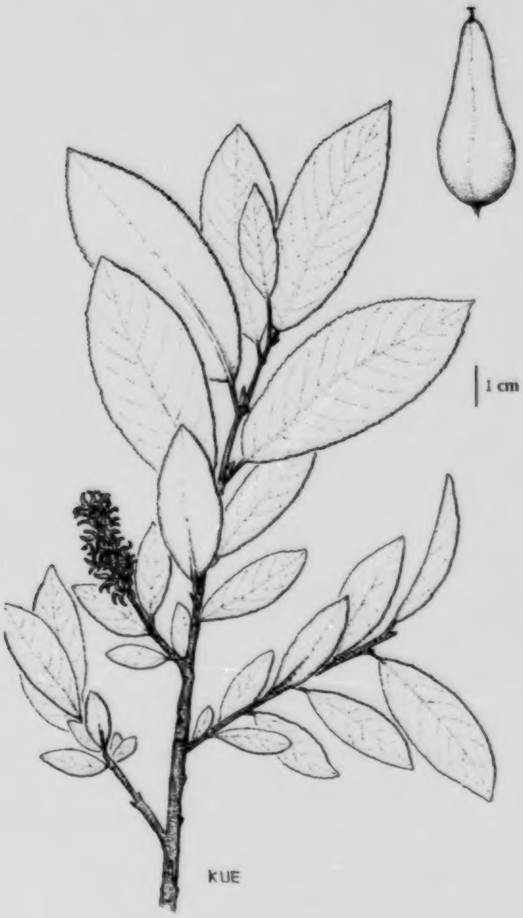
General: Dioecious shrubs, 0.1-3(-4.5) m tall, not colonial; branches erect, flexible at base; twigs brownish, smooth or densely hairy.

Leaves: Alternate, simple, narrowly elliptic to egg-shaped, 2-7.5 cm long, 0.8-2.6 cm wide, lower surface glaucous, smooth or midrib sparsely long soft-hairy, hairs white and rust-coloured, upper surface shiny or highly glossy, smooth, margins entire or sometimes toothed, bases and tips pointed; leaf stalks without glandular dots at top; stipules leaflike, linear, often longer than the stalks, persistent 2-4 years.

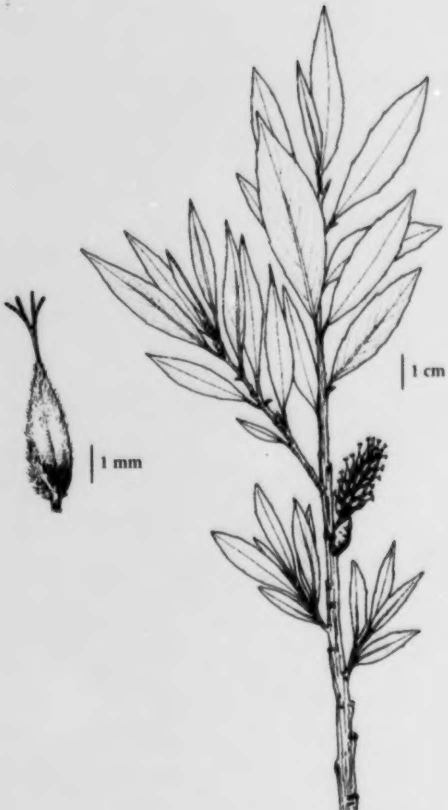
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins stout, unstalked; floral bracts dark, hairs straight; stamens 2; ovaries 1, hairy; styles 1-1.8 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.2-0.8 mm long.

Notes: This species may hybridize with *S. planifolia* where their ranges overlap in N BC.



Salix pseudomyrsinites



Salix pulchra

***Salix pyrifolia* Andersson**

balsam willow

HABITAT/RANGE:

Wet to moist muskeg, fens, stream margins and clearings in the montane zone; infrequent in E BC north of 53° N; N to YT and S NT, E to NF and S to ME, NH, MI, WI and MN.

DESCRIPTION:

General: Dioecious shrubs, 0.4-4 m tall, not colonial; branches erect, flexible at base; twigs yellowish to red-brown, smooth or sparsely hairy; buds and foliage with a balsam-like fragrance

Leaves: Alternate, simple narrowly oblong to elliptic or broadly elliptic, 3-10 cm long, 2-4 cm wide, lower surface glaucous, smooth, upper surface shiny or highly glossy, smooth, margins toothed or entire, bases heart-shaped to rounded, tips pointed; leaf stalks with or without glandular dots at top; stipules leaflike but soon lost.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or just before them, the catkins stout, on leafy twigs; floral bracts pale, hairs straight or wavy; stamens 2; ovaries 1, smooth; styles 0.4-0.5 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 1.8-3.5 mm long.

***Salix raupii* Argus**

Raup's willow

HABITAT/RANGE:

Moist thickets, open forests and gravel floodplains in the montane zone; rare in N BC; N to YT and NT and E to W AB.

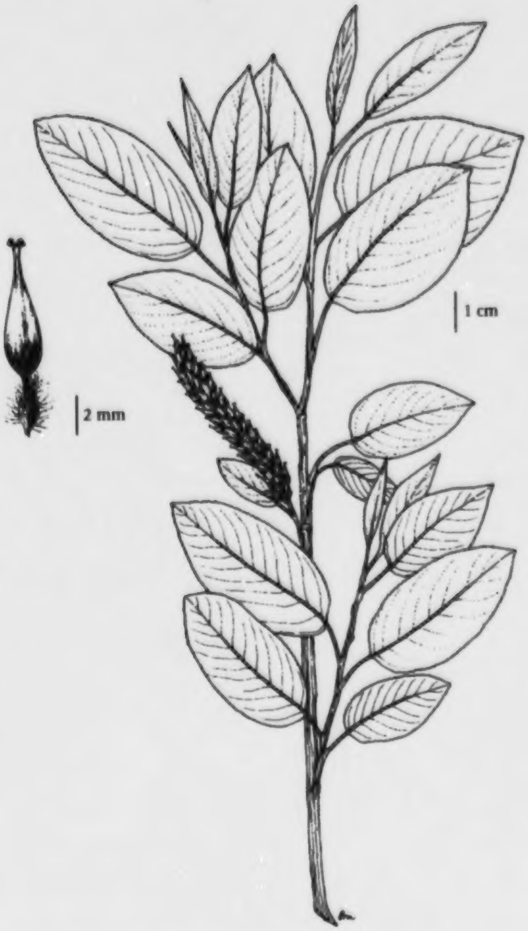
DESCRIPTION:

General: Dioecious shrubs, 1.2-1.8 m tall, not colonial; branches erect, flexible at base; twigs yellow-brown, smooth.

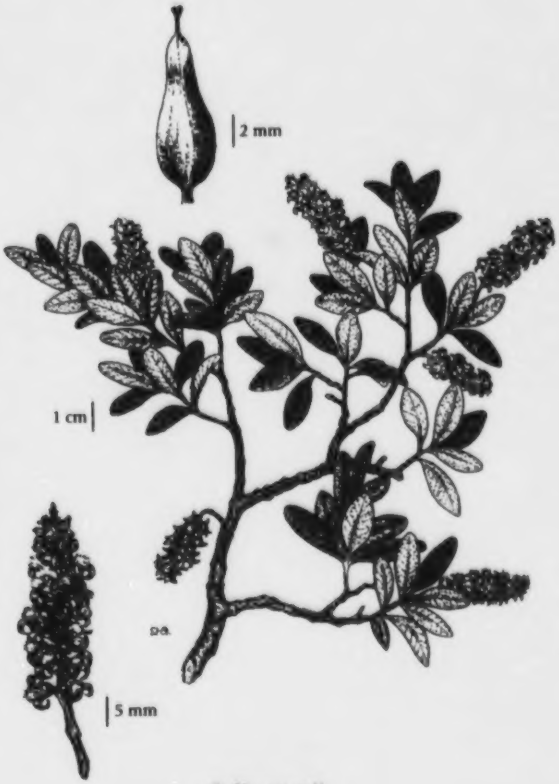
Leaves: Alternate, simple, narrowly elliptic, 3-6 cm long, 1-2 cm wide, lower surface glaucous, smooth; upper surface shiny, smooth, margins entire, bases rounded to pointed, tips pointed; leaf stalks without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts pale, smooth; stamens 2; ovaries 1, smooth or hairy; styles 0.6-0.8 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.4-1.2 mm long.



Salix pyrifolia



Salix raupii

***Salix reticulata* L.**

net-veined willow; net-leaved willow

HABITAT/RANGE:

Moist to dry meadows, seepage areas and openings in the alpine and subalpine zones (ssp. *reticulata*), cliffs and ledges in the alpine zone (ssp. *glabellicarpa*); common in N BC (ssp. *reticulata*), rare on the Queen Charlotte Islands (ssp. *glabellicarpa*); circumpolar, ssp. *reticulata* – N to NT and E to NF and S to NM, UT and CA; Eurasia, ssp. *glabellicarpa* – endemic to BC and SE AK.

DESCRIPTION:

General: Dwarf shrubs, 3-15 cm tall, spreading by layering; branches trailing, flexible at base; twigs yellow- to red-brown, smooth.

Leaves: Alternate, simple, broadly oblong to broadly elliptic or nearly circular, 1-6.5 cm long, 0.8-5 cm wide, lower surface glaucous, silky to nearly smooth, hairs white, upper surface shiny or highly glossy and deeply net-veined, smooth, entire or obscurely toothed, bases rounded or heart-shaped, tips rounded; leaf stalks with or without glandular dots at top; stipules rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts pale; stamens 2; ovaries 1, hairy or smooth; styles 0.2-0.4 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0-0.8 mm long.

Notes: Two subspecies occur in BC:

1. Pistils densely hairy, stalks hairy; bract tips rounded or retuse .... ssp. *reticulata*

1. Pistils smooth and glaucous, or with patches of pubescence, stalks smooth; bract tips retuse .... ssp. *glabellicarpa* Argus

Notes: In this species the vegetative twigs almost always terminate in a catkin.

***Salix richardsonii* Hook.** (*Salix lanata* L. ssp. *richardsonii* [Hook.] A.K. Skvortsov)

Richardson's willow

HABITAT/RANGE:

Moist to mesic thickets, streambanks, gravelly shores, rocky slopes, fens, meadows and open forests from the montane to alpine zones; frequent in N BC; amphiberingian, N to AK, YT and NT and disjunct to SK; E Asia.

DESCRIPTION:

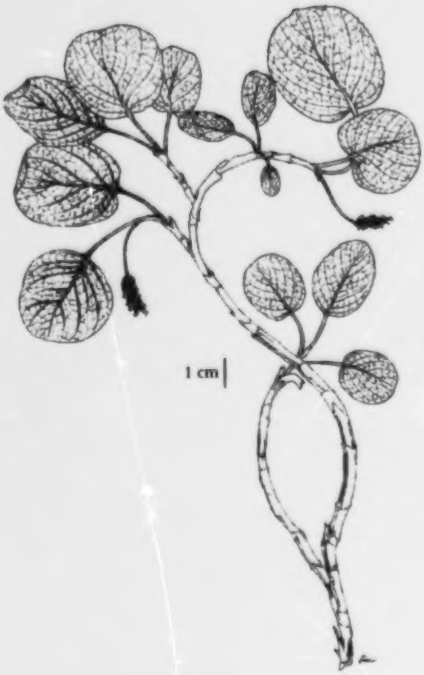
General: Dioecious shrubs 0.3-2.5 (-6.5) m tall, not colonial; branches erect, flexible at base; twigs red- to yellow-brown, sparsely to densely hairy.

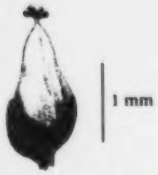
Leaves: Alternate, simple, elliptic to broadly elliptic or egg-shaped, 2-10 cm long, 1-5.5 cm wide, lower surface glaucous, smooth or sparsely long soft-hairy becoming nearly smooth, hairs white and rust-coloured, upper surface shiny, long soft-hairy to nearly smooth, margins entire or blunt-toothed, bases and tips pointed to rounded; leaf stalks without glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins stout, unstalked; floral bracts dark, hairs straight; stamens 2; ovaries 1, smooth; styles 1.6-2.8 mm long.

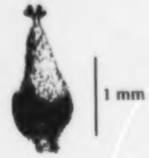
Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.4-1 mm long.

Notes: Vegetative specimens of *Salix richardsonii* are sometimes difficult to distinguish from *S. barclayi* (see Table 3, page 60).



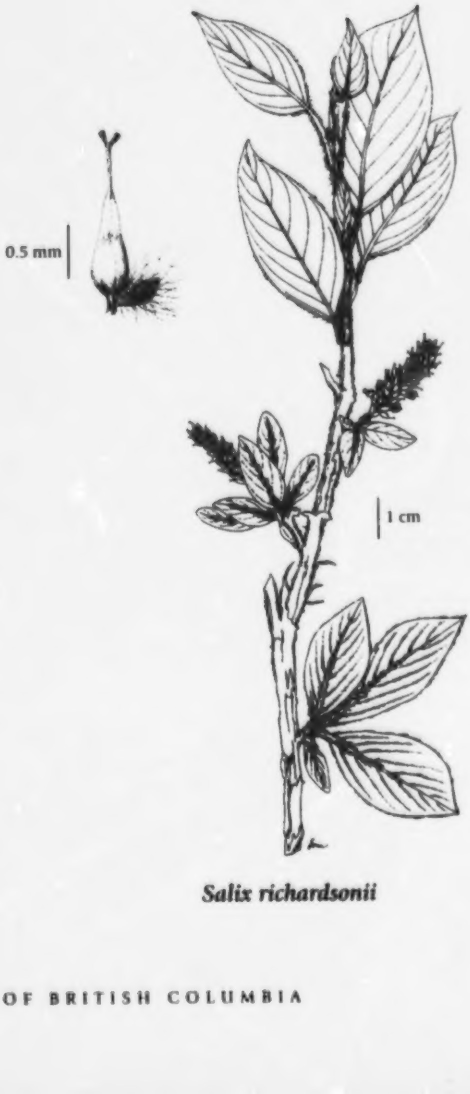


ssp. *glabellicarpa*



ssp. *reticulata*

Salix reticulata



Salix richardsonii

***Salix* x *rubens* Schrank**

hybrid white willow

HABITAT/RANGE:

Moist to wet riverine habitats in the steppe and montane zones; infrequent throughout BC; introduced from Europe.

DESCRIPTION:

General: Dioecious trees 3-15 m tall, not colonial; branches erect, highly brittle at base; twigs yellow- to red-brown, hairy.

Leaves: Alternate, simple narrowly elliptic, 7-16 cm long, 1-3 cm wide, lower surface glaucous, smooth or silky but soon nearly smooth, hairs white, upper surface shiny or dull, smooth or silky but soon nearly smooth, margins toothed, bases pointed to wedge-shaped, tips tapering; leaf stalks with glandular dots at top; stipules leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins slender, on leafy twigs; floral bracts pale, hairs straight, female bracts deciduous; stamens 2; ovaries 1, smooth; styles 0.4-1 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.3-0.5 mm long.

Notes: This hybrid (*S. alba* L. x *S. fragilis* L.) is the most commonly cultivated and most readily naturalized introduced willow in North America. It is probably more common in BC than indicated on distribution maps. Reports of *S. fragilis* L. from BC are probably based on this taxon.

***Salix scouleriana* J. Barratt *ex* Hook.** (*S. scouleriana* var. *coetanea* C. Ball, *S. scouleriana* f. *poikila* C. Schneider)

Scouler's willow; mountain willow

HABITAT/RANGE:

Dry to moist open forests, thickets, clearings and edges of rivers and lakes in the lowland, steppe and montane zones; common throughout BC; N to AK, YT and NT, E to SK and S to SD, AZ, NM, and CA.

DESCRIPTION:

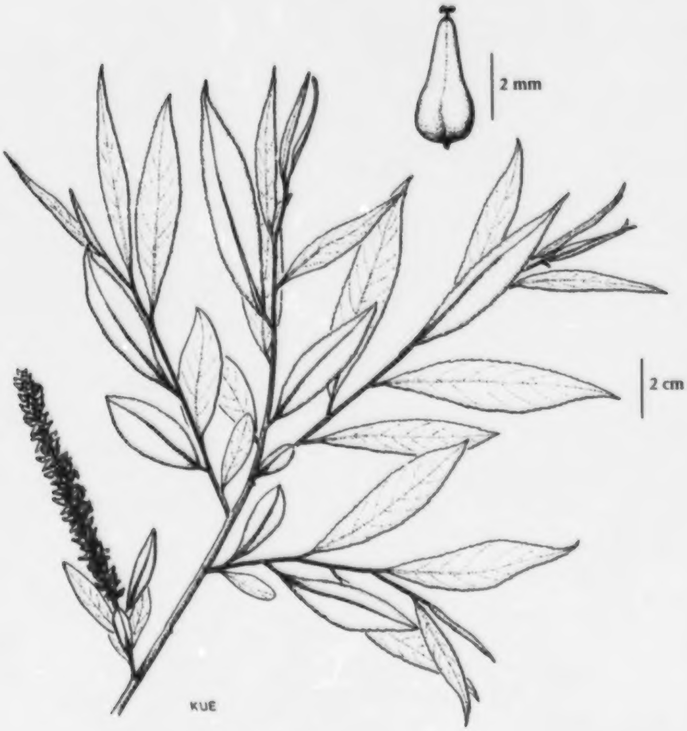
General: Dioecious shrubs or trees, 3-20 m tall, not colonial; branches erect, flexible at base; twigs yellow-green to yellow-brown, sparsely to densely velvety-hairy.

Leaves: Alternate, simple, narrowly elliptic to lance- or egg-shaped, 3-8.5 cm long, 1-3.6 cm wide, lower surface glaucous, silky to woolly hairy, becoming sparsely so, hairs white and rust-coloured, upper surface shiny, sparsely long soft-hairy becoming nearly smooth, midrib remaining hairy, margins entire or toothed, bases and tips pointed to rounded; leaf stalks without glandular dots at top; stipules leaflike.

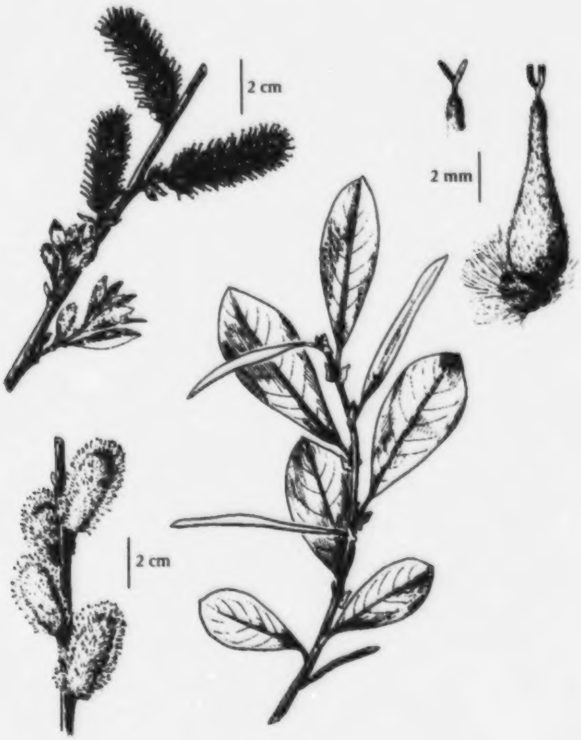
Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins stout, unstalked; floral bracts dark or pale, hairs straight; stamens 2; ovaries 1, hairy; styles 0.2-0.6 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.8-2.3 mm long.

Notes: The lower leaf surface in this species displays 2 radically different forms of hairiness. Most commonly it has a sparse mixture of short, appressed, rust-coloured or white hairs, but forms that are densely woolly with long, wavy, erect to spreading, white hairs may occur in the same population. Both forms have velvety leaf stalks and twigs.



Salix x rubens



Salix scouleriana

Salix serissima **(L. H. Bailey) Fern.**

autumn willow

HABITAT/RANGE:

Wet thickets, meadows and fens in the montane zone; rare in NE BC; N to S NT, E to NF and S to MA, NJ, PA, OH, IN, IL, MN, SD and CO.

DESCRIPTION:

General: Dioecious shrubs, 1-5 m tall, not colonial; branches erect, flexible at base; twigs yellow- to red-brown, smooth.

Leaves: Alternate, simple, leathery, narrowly oblong to elliptic, lance-, or narrowly egg-shaped, 4-9.5 cm long, 1-3 cm wide, lower surface glaucous or not, smooth, upper surface highly glossy, smooth, margins toothed, bases pointed to rounded, tips pointed; leaf stalks with glandular dots at top; stipules absent or rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or after them, the catkins stout, on leafy twigs; floral bracts pale, hairs straight, female bracts deciduous; stamens 3-9; ovaries 1, smooth; styles 0.3-1 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 1.2-2.4 mm long.

Salix sessilifolia **Nutt.** (*S. macrostachya* Nutt., *S. exigua* var. *sessilifolia* [Nutt.] Dorn)

soft-leaved willow; sessile-leaved sandbar willow; northwest sandbar willow

HABITAT/RANGE:

Moist to mesic sandbars in the lowland zone; rare in extreme SW BC (lower Fraser Valley); S to CA.

DESCRIPTION:

General: Dioecious shrubs, 3-5 m tall, forming colonies by root shoots; branches erect, flexible at base; twigs red-brown, densely hairy.

Leaves: Alternate, simple, linear to narrowly elliptic or narrowly lance-shaped, 4-12 cm long, 0.8-1.4 cm wide, lower surface not glaucous, silky or long soft-hairy, hairs white, upper surface dull, silky or long soft-hairy, margins remotely and minutely spiny-toothed, bases wedge-shaped to rounded, tips tapered; leaf stalks without glandular dots at top; stipules rudimentary or leaflike.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or throughout season, the catkins slender, on leafy twigs; floral bracts pale or dark, hairs wavy, female bracts deciduous; stamens 2; ovaries 1, hairy; styles 0.2-0.4 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.2-0.7 mm long.

Notes: This species is distinguished from *S. melanopsis* by its long, slender stigmas (0.4-1 versus 0.2-0.5 mm long) and densely silky leaves.

Salix setchelliana **C. R. Ball**

Setchell's willow

HABITAT/RANGE:

Pioneer on moist to mesic, sandy to gravelly glacial riversides and glacial moraines in the montane zone; rare in extreme NW BC; N to AK and SW YT.

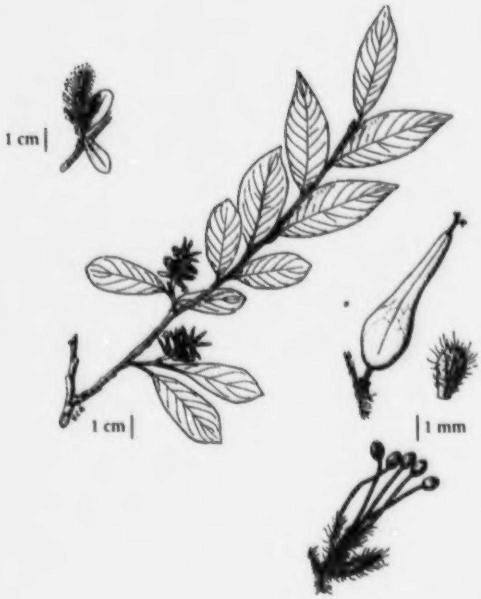
DESCRIPTION:

General: Dioecious shrubs, 8-30 cm tall, forming colonies by root shoots; branches decumbent or erect, flexible at base; twigs reddish, very densely hairy.

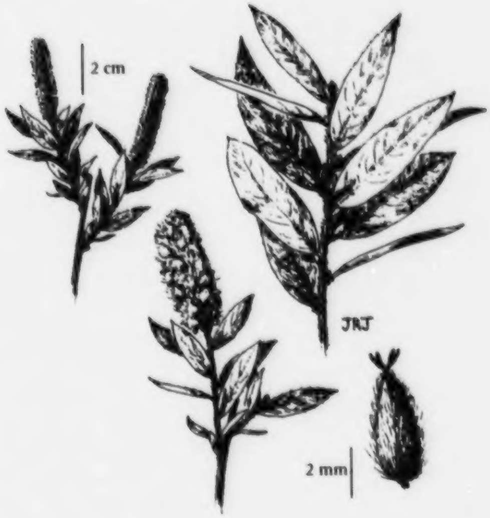
Leaves: Alternate, simple, leathery, narrowly oblong to elliptic or egg-shaped, 2.5-6.6 cm long, 1-2 cm wide, lower surface glaucous, smooth or nearly so, upper surface dull, smooth, margin entire to toothed, bases pointed, tips rounded to pointed; leaf stalks without glandular dots at top; stipules absent or rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout, on leafy twigs; floral bracts pale, smooth; stamens 2; ovaries 1, smooth; styles 0.3-0.4 mm long.

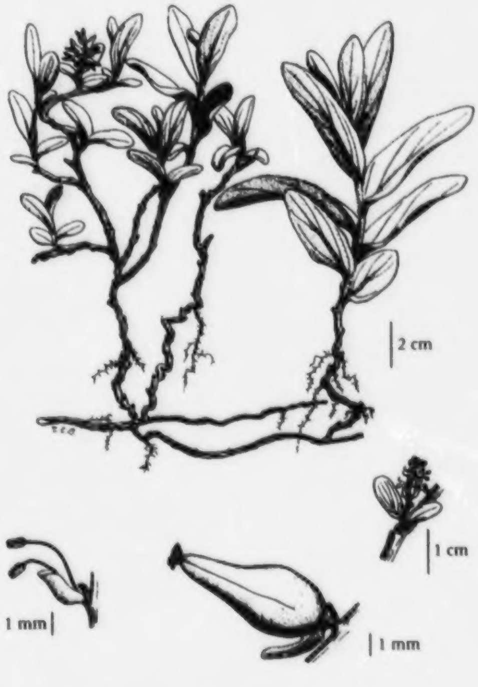
Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0-0.6 mm long.



Salix serissima



Salix sessilifolia


2 cm
1 cm
1 mm
1 mm

Salix setchelliana

***Salix sitchensis* Sanson *ex* Bong.**

Sitka willow

HABITAT/RANGE:

Moist to mesic thickets, floodplains, lakeshores, avalanche tracks, clearings and forest margins in the lowland and montane zones; common in S BC south of 56° N, especially W of the Coast-Cascade Mountains, infrequent northward; N to S AK, E to AB and S to MT, ID and CA.

DESCRIPTION:

General: Dioecious shrubs or trees, 1-8 m tall, not colonial; branches erect, flexible at base; twigs yellow- to red-brown, densely hairy.

Leaves: Alternate, simple, elliptic to lance- or egg-shaped, 3-12 cm long, 1.7-5 cm wide, lower surface very densely silky, satiny, or woolly, hairs white, upper surface dull, sparsely long soft-hairy to nearly smooth, margins entire or toothed, bases pointed, tips rounded to pointed; leaf stalks without glandular dots at top; stipules leaflike or rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge or just before them, the catkins slender to stout, on leafy twigs; floral bracts pale or dark, hairs straight or wavy; stamens 1; ovaries 1, hairy; styles 0.4-0.8 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.4-1.4 mm long.

***Salix stolonifera* Coville**

creeping willow

HABITAT/RANGE:

Moist meadows in the alpine zone; frequent in NW BC; N to AK and YT and E to AB.

DESCRIPTION:

General: Dwarf shrubs, 2-9 cm tall, forming rhizomatous mats; branches trailing or erect, flexible at base; twigs brownish, smooth.

Leaves: Alternate, simple, elliptic to nearly circular, 1.6-4.2 cm long, 1.2-3.8 cm wide, lower surface glaucous, hairy; becoming nearly smooth, hairs white, upper surface highly glossy, smooth or margin fringed with long hairs, margins entire or toothed, bases rounded to pointed, tips rounded or notched; leaf stalks without glandular dots at top; stipules rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins stout to globe-shaped, on leafy twigs; floral bracts dark, hairs straight or wavy; stamens 2; ovaries 1, smooth or hairy on beak; styles 0.6-1.6 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.2-0.8 mm long.

Notes: This species hybridizes with *S. arctica* and *S. barclayi*.

***Salix tweedyi* (Bebb *ex* Rose) C.R. Ball** (*S. barrattiana* Hook. var. *tweedyi* Bebb *ex* Rose)

Tweedy's willow

HABITAT/RANGE:

Moist streamsides and lakeshores in the montane zone; rare in SC BC; S to WY, ID and WA.

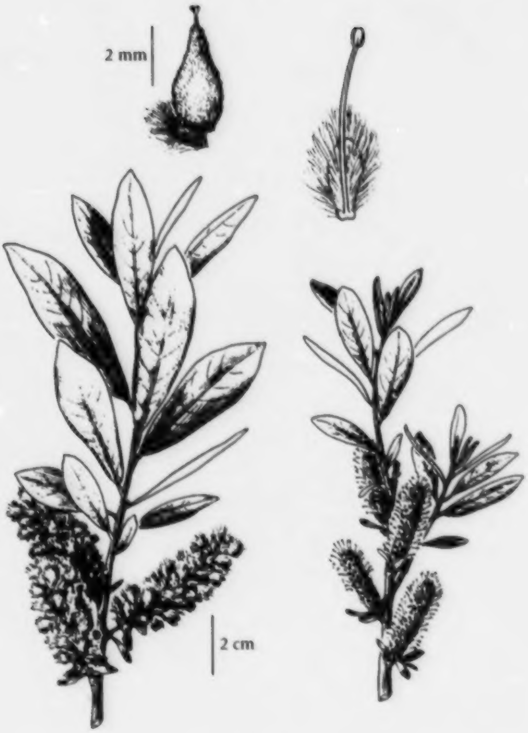
DESCRIPTION:

General: Dioecious shrubs, 1-3 m tall, not colonial; branches erect, flexible at base; twigs yellow-brown, sparsely to densely hairy.

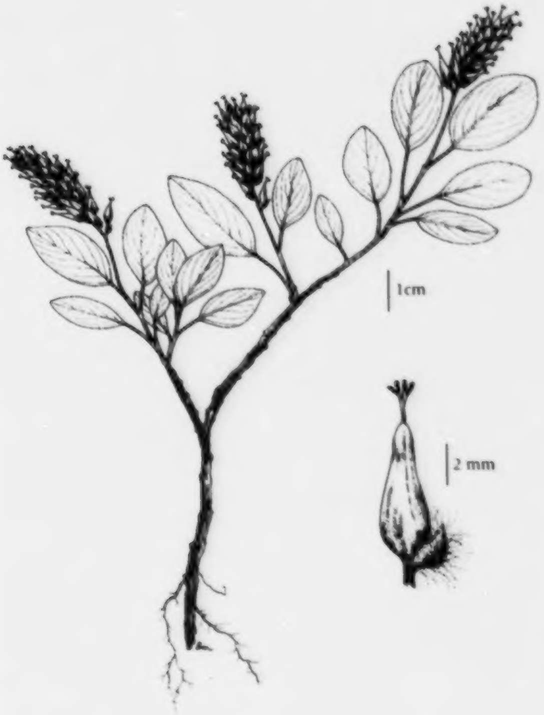
Leaves: Alternate, simple, elliptic or broadly elliptic, 3.5-10 cm long, 1.7-5 cm wide, lower surface glaucous or not, long soft-hairy, hairs white, upper surface dull, long soft-hairy to nearly smooth, margins toothed with coarse, spreading teeth or nearly entire, bases rounded or heart-shaped, tips pointed; leaf stalks not glandular at top; stipules leaflike, persistent.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins stout, unstalked; floral bracts dark, hairs straight or wavy; stamens 2; ovaries 1, smooth; styles 1.1-2.8 mm long.

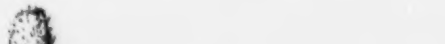
Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.4-1.5 mm long.



Salix sitchensis



Salix stolonifera



Salix tweedyi

***Salix vestita* Pursh**

rock willow

HABITAT/RANGE:

Moist to dry open forests and rocky streamsides in the upper montane and subalpine zones, rarely in the alpine zone; locally common in extreme E BC, less common westward; E to AB and disjunct in N MB to NS and NF and S to MT and OR.

DESCRIPTION:

General: Dioecious shrubs, 0.2-1.5 m tall, not colonial; branches erect, flexible at base; twigs yellow- to grey-brown, sparsely to densely hairy.

Leaves: Alternate, simple, leathery, broadly elliptic to egg-shaped, 2-7 cm long, 1-4 cm wide, lower surface glaucous, long soft-hairy or veins with long straight hairs, hairs white, upper surface shiny, deeply impressed veiny, smooth or silky, margins entire or toothed, bases rounded, tips rounded or notched; leaf stalks with or without dark, glandular dots at top; stipules rudimentary.

Flowers: Unisexual, lacking sepals and petals, borne in catkins which flower as leaves emerge, the catkins slender, on leafy twigs; floral bracts pale, hairs straight; stamens 2; ovaries 1, hairy; styles 0.2-0.4 mm long.

Fruits: Capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.4-1.2 mm long.

Notes: In this species the vegetative twigs almost always terminate in a catkin.

TABLE 1. Comparison of *Salix arctica, S. petrophila* and *S. cascadensis.*

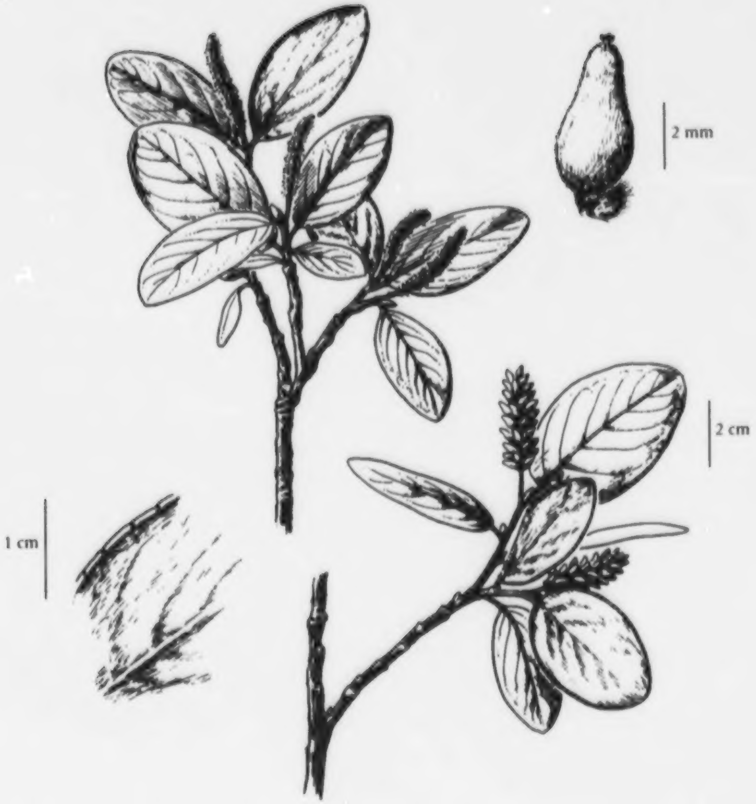
Characteristics	*S. arctica*	*S. petrophila*	*S. cascadensis*
Vegetative reproduction	layering	layering	rhizomatous mats
Height (cm)	3-25	2-10	1-4
Twig hairiness	smooth or long soft-hairy	smooth, sometimes sparsely long soft-hairy	smooth or long soft-hairy
Mature leaves	not persistent	not persistent	often persistent for 2 years
Floral bracts	brown or black	light brown to tawny	brown
Style length (mm)	0.6-2.2	0.4-1.6	0.3-1
Capsule stalk length (mm)	0.2-1.6	0.2-0.8	0-0.6

TABLE 2. Comparison of *S. myrtillifolia, S. pseudomyrsinites* and *S. boothii.*

Characteristics	*S. myrtillifolia*	*S. pseudomyrsinites*	*S. boothii*
Height (m)	0.1-0.6 (1)	1-7	0.25-6
Juvenile leaves	smooth	hairy with white and rust-coloured hair	hairy with white hair
Leaf stalks: Top end	not glandular	not glandular	glandular or not
Stalks length (mm)	1.5-8	2.5-8	3-17
Mature leaves, upper surface midrib	smooth	hairy with white and rust-coloured hair	smooth or sparsely hairy with white hair
Female catkins, flowering twig length (mm)	1.5-12	0.5-10	1-5

TABLE 3. Comparison of *S. barclayi* and *S. richardsonii.*

Characteristics	*S. barclayi*	*S. richardsonii*
Twigs	glabrous or long soft-hairy	long soft-hairy or sparsely so
Juvenile leaves	smooth or sparsely long soft-hairy	long soft-hairy or sparsely so
Mature leaves: Hair color	white	white or white and rust-coloured
Base shape	usually rounded	pointed to rounded
Margins	saw-toothed	entire or saw-toothed
Catkins: flowering time	with leaf emergence	before leaf emergence
flowering twigs	present and leafy	lacking



Salix vestita

SANTALACEAE

1. Flowers 3 or 4, or fewer, in upper leaf axils; hypanthium flared; fruits orange to red, juicy .... *Geocaulon*

1. Flowers several to numerous in subterminal or terminal compact clusters; hypanthium bell-shaped to top-shaped; fruits blue to brown, dry .... *Comandra*

COMANDRA

Comandra umbellata **(L.) Nutt.** (*C. pallida* A. DC. = var. *pallida*; *C. californica* Eastw. *ex* Rydb. = var. *californica*)
pale comandra (var. *pallida*); **California comandra** (var. *californica*); **bastard toad-flax** (var. *umbellata*)

HABITAT/RANGE:

Mesic to dry sandy or rocky slopes and shrublands in the lowland, steppe and montane zones; infrequent in NE, SC and SE BC, rare on S Vancouver Island; var. *californica* – S to AZ and CA; var. *pallida* – N to YT and NT, E to MB and S to MN, TX, NM AZ, and OR; var. *umbellata* – N to NT, E to NF and S to ME, PA, NC, GA, MS and OK.

DESCRIPTION:

General: Perennial parasitic herb from widespread rhizomes; stems erect, several, clustered, simple, 5-30 cm tall.

Leaves: Basal leaves lacking; stem leaves alternate, linear-elliptic to lanceolate or widely oblanceolate, entire, short-stalked to nearly unstalked, 5-40 mm long, 1-10 mm wide, thick, fleshy, greenish to glaucous.

Flowers: Inflorescence of terminal, compact clusters of somewhat bell-shaped; greenish to white or purple, apetalous flowers; calyces tube-shaped with 5 spreading lobes; stamens 1 mm long and hairy at the base.

Fruits: Berry-like, dry to fleshy, blue to purple or brown, 4-9 mm long.

Notes: Three varieties are recognized in BC. The vars. *californica* and *umbellata* may be difficult to separate:

1. Calyx lobes narrowly lanceolate, (2.5) 3-4 mm long; leaves thick and glaucous, the midnerve sometimes visible (the secondary nerves rarely visible); fruits 6-9 mm long; plants more frequent to the north .... var. *pallida* (A. DC.) M.E. Jones

1. Calyx lobes narrowly egg-shaped to egg-shaped, (1.5) 2-2.5 (3) mm long (if the lobes 2.5 mm or longer then the leaves usually not glaucous and without visible midnerves); fruits 4-6 mm long; plants of S BC.

    2. Leaves somewhat fleshy, usually strongly glaucous, secondary veins usually not visible, the margins rarely rolled towards the underside of the leaves .... var. *californica* (Eastw. *ex* Rydb.) C.L. Hitchc.

    2. Leaves thinner, usually only slightly if at all glaucous, the secondary veins usually plainly visible, the margins usually slightly rolled under towards the underside of the leaves .... var. *umbellata*

GEOCAULON

Geocaulon lividum **(Richards.) Fern.** (*Comandra livida* Richards.)
false toad-flax; northern comandra

HABITAT/RANGE:

Dry to mesic forests and bogs in the montane and subalpine zones; common throughout BC in and E of the Coast-Cascade Mountains except rare on the N coast and SC BC; N to AK, YT and NT, E to NF and S to ME, NY, MI, WI, MN, MT, ID and WA.

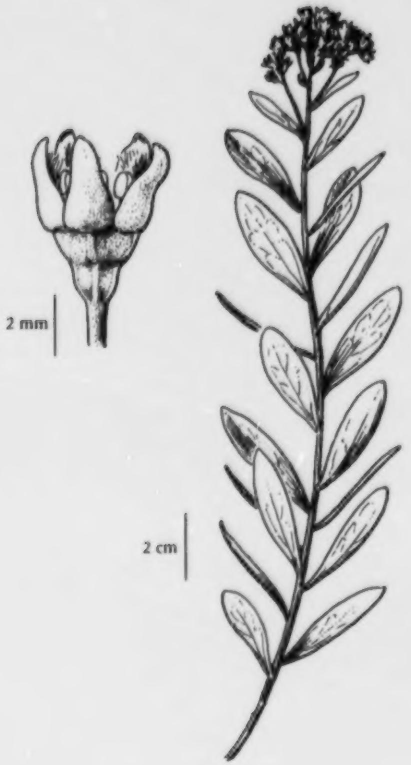
DESCRIPTION:

General: Perennial parasitic herb from widespread rhizomes; stems erect, 1 to several in a clump, simple, 10-20 cm tall.

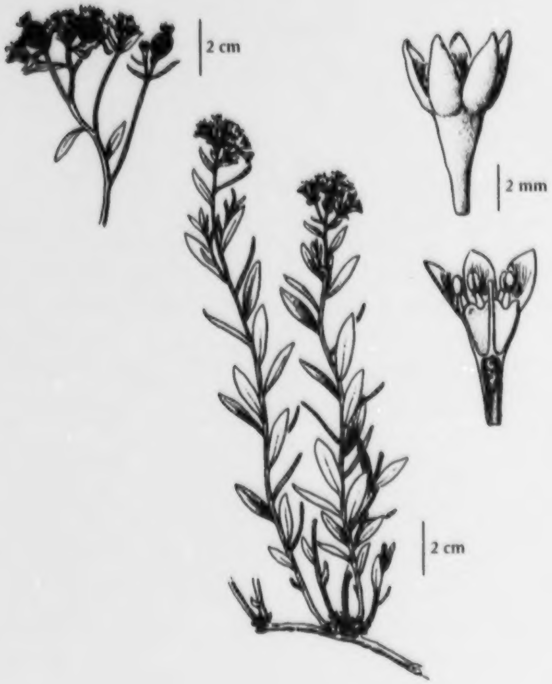
Leaves: Basal leaves lacking; stem leaves alternate, entire, short-stalked, narrow to widely egg-shaped, 1.5-4 cm long.

Flowers: Inflorescence of axillary or subterminal cymose clusters of 3 greenish-purple, apetalous flowers with the lateral pair soon deciduous, leaving an elongated terminal flower; calyces bell-shaped with 5 triangular lobes 1.5 mm long and spreading; stamens 0.5 mm long.

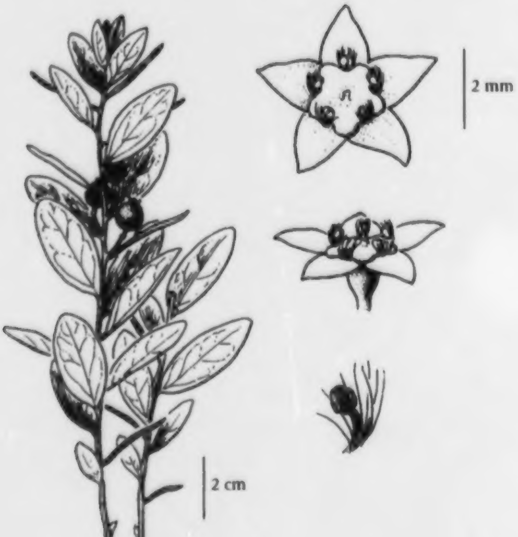
Fruits: Drupe-like, round, fleshy, red, 5-10 mm wide.



Comandra umbellata var. *californica*



Comandra umbellata var. *pallida*



Geocaulon lividum

SARRACENIACEAE

SARRACENIA

***Sarracenia purpurea* L. ssp. *gibbosa* (Raf.) Wherry**
common pitcher-plant

HABITAT/RANGE:

Bogs and fens in the montane zone; rare in NE BC, known only from the Fort Nelson area; N to NT, E to NF and S to NY, VA, OH, IN, IL, MN and CA.

DESCRIPTION:

General: Insectivorous perennial herb from a fibrous root; stems erect, 20-40 cm tall.

Leaves: Basal leaves clustered, hollow, often marked with purple or dark red, open at the top or with a kidney-shaped flap, with bentback hairs inside the flap and tube.

Flowers: Inflorescence a solitary flower; petals usually egg-shaped, deep purple on both sides, 2-6 cm long; sepals egg- to diamond-shaped, dark purple outside, pale green inside, 2-6 cm long.

Fruits: Capsules.

SAXIFRAGACEAE[2]

1. Styles 3; petals deeply cleft; flowers sometimes partially replaced by bulblets .... *Lithophragma*
1. Styles usually 2; petals entire to variously divided, sometimes absent; flowers not usually replaced by bulblets.
  2. Petals absent; sepals 4 .... *Chrysosplenium*
  2. Petals usually present; sepals 5.
    3. Stamens 3 or 5 (where 5, one or more occasionally rudimentary).
      4. Stamens 3; calyces greenish-purple to brown, 7-10 mm long, cylindric, deeply cleft, oblique at the base, irregular above .... *Tolmiea*
      4. Stamens 5; calyces not as above.
        5. Petals absent .... *Heuchera*
        5. Petals present.
          6. Petals dissected into 4 to 10, linear segments .... *Mitella*
          6. Petals entire or lobed.
            7. Petals with 3 to 7 lobes.
              8. Stems usually leafy; calyces tubular .... *Elmera*
              8. Stems usually leafless; calyces bell-shaped .... *Mitella* (*trifida*)
            7. Petals entire or bilobed.
              9. Ovaries 2-chambered, placentation axile (i.e., ovules attached to the center axis of the ovary).
                10. Large plants without bulblets, 30-60 cm tall; basal leaves 2-6 (8) cm wide .... *Boykinia*
                10. Smaller plants, 10-30 (35) cm tall, with bulblets at the stem-bases; basal leaves 1-4 cm wide .... *Suksdorfia*
              9. Ovaries 1-chambered, placentation parietal (i.e., ovules attached to the inner walls of the ovary)

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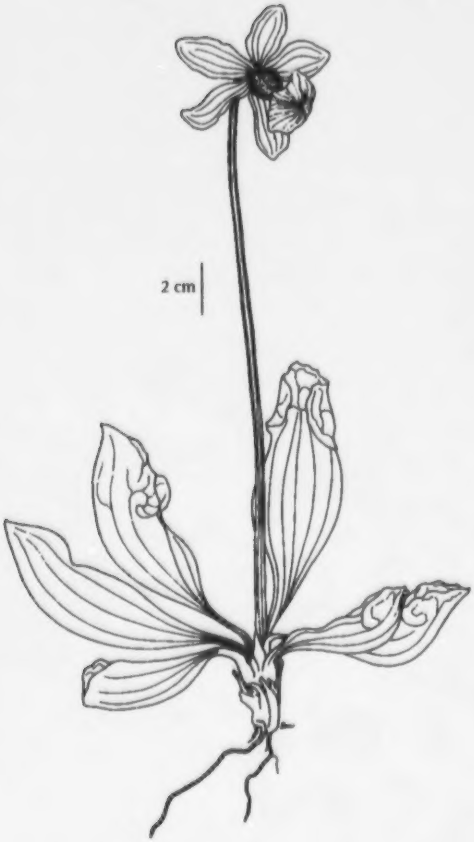
[2] Contributed by G.W. Douglas and D. Meidinger.



Sarracenia purpurea ssp. *gibbosa*

11. Calyces joined to the ovaries only at the base .... *Elmera*

11. Calyces joined to the ovaries at least halfway to the top .... *Heuchera*

3. Stamens 10.

  12. Petals narrowly lobed or dissected into 8 linear segments.

    13. Small plants, up to 20 cm tall; basal leaves 1-3 cm wide; petals dissected into 8 linear segments .... *Mitella* (*nuda*)

    13. Large plants, up to 80 cm tall; basal leaves 3-10 cm wide; petals narrowly lobed .... *Tellima*

  12. Petals entire.

    14. Ovaries 1-chambered, placentation parietal (i.e., ovules attached to the inner walls of the ovary); capsule valves of markedly unequal size .... *Tiarella*

    14. Ovaries 2-chambered, placentation axile (i.e., ovules attached to the center axis of the ovary); capsule valves of about equal size.

      15. Carpels almost separate, united only towards the base; basal leaves 3-15 cm long, smooth, leathery, narrowly egg-shaped to elliptic .... *Leptarrhena*

      15. Carpels united considerably above the base; leaves various but not leathery .... *Saxifraga*

BOYKINIA

Boykinia occidentalis **T. & G. (*B. elata* [Nutt.] Greene)**

coast boykinia

HABITAT/RANGE:

Moist woodlands, meadows and streambanks in the lowland and montane zones; frequent on Vancouver Island and the adjacent mainland; S to CA.

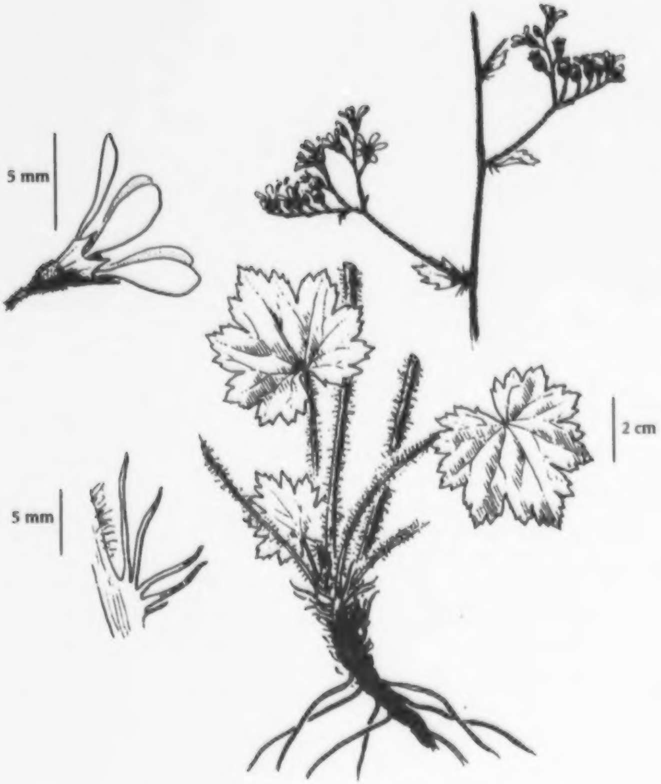
DESCRIPTION:

General: Perennial herb from rhizomes; stems slender, leafy, 15-60 cm tall, brownish- to reddish-hairy, often glandular-hairy.

Leaves: Basal and lower stem leaves long-stalked, heart- to kidney-shaped, 2-8 cm wide, 5- to 7-cleft to about 1/2 their length, 2- to 3-times sharply-toothed, the teeth bristle-tipped; upper stem leaves unstalked; stipules slightly winged with several, long brownish bristles.

Flowers: Inflorescence a terminal, open, compound panicle, the stalks reddish, densely glandular; flowers slightly irregular; petals white, 5-6 mm long, spoon-shaped to oblanceolate, short-clawed, deciduous; calyces 4-5 mm long, top- to urn-shaped, lobed about 1/3 length into narrowly lance-shaped segments, the lobes smooth, the base attached to ovary, glandular; stamens 5, shorter than sepals; pistils solitary, the ovary over 1/2 inferior.

Fruits: Capsules, beaked; seeds black, minutely spiny.



Boykinia occidentalis

CHRYSOSPLENIUM

1. Sepals minutely purple-dotted; leaf stalks usually crinkly-hairy .... *C. wrightii*
1. Sepals green or golden-yellow; leaf stalks smooth or soft-hairy.
    2. Sepals green, erect, of equal size; stamens 4 .... *C. tetrandrum*
    2. Sepals golden-yellow, spreading, the outer pair wider; stamens of the inner flowers 5-8, of the outer flowers 2-4 .... *C. iowense*

***Chrysosplenium iowense* Rydb.** (*C. alternifolium* L. var. *iowense* [Rydb.] Boivin)
Iowa golden-saxifrage; Iowa golden carpet

HABITAT/RANGE:

Wet to moist streambanks and marshy ground in the montane zone; rare in NE BC, known only from the Dawson Creek area; N to SW NT and E to SW MB, disjunct in NE IA.

DESCRIPTION:

General: Perennial herb from slender rhizomes; stems succulent, erect, 3-15 cm tall, generally branched above, trailing shoots (stolons) leafy.

Leaves: Basal leaves round-to kidney-shaped, 5-20 mm wide, round-toothed, noticeably veined above (in live plants), often coarse white-hairy, the stalks 1-3.5 cm long, mostly smooth, sometimes red soft-hairy; stem leaves usually 2, sometimes 1 or 3, kidney to fan-shaped, shallowly lobed, smooth.

Flowers: Inflorescence terminal, of clusters of 5 to 12 flowers, the flowers short bell-shaped, 2.5-5 mm across, the inner flowers larger than outer; bracts yellow, fan- to egg-shaped, lobed; petals lacking; calyces joined to lower half of ovaries; sepals 4, spreading, golden-yellow, 3-veined, the outer pair usually slightly wider than long, the tips rounded or blunt and often curved back, the inner pair similar but narrower so usually longer than wide; stamens 2 to 8, usually 5 to 8 in inner flowers, 2 to 4 in outer; styles 0.3-0.4 mm long, the disk narrow and entire.

Fruits: Capsules, the free portion 2-lobed; seeds smooth, 0.7-0.9 mm long, light brown.

Notes: Included by some authors in the European *C. alternifolium* L., but it is quite distinct (Packer 1991).

***Chrysosplenium tetrandrum* (Lund) T. Fries** (*C. alternifolium* L. var. *tetrandrum* Lund)
northern golden-saxifrage; golden carpet

HABITAT/RANGE:

Moist to wet shady banks, rock crevices, mossy seeps, and shorelines in the montane and subalpine zones; common throughout N and E BC, infrequent south to 51° N in the Coast/Cascade Mountains; circumpolar, N to AK, YT and NT, E to N PQ and Labr. and S to WA, disjunct in CO; Eurasia.

DESCRIPTION:

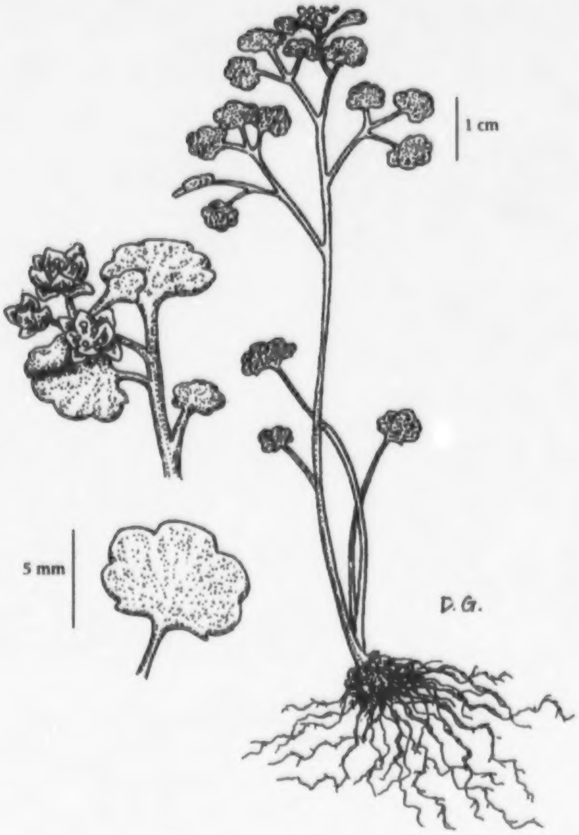
General: Perennial herb from slender stolons; stems succulent, ascending to erect, to 15 cm long, with erect portions to 10 cm tall, 2- or 3-branched near tips, trailing shoots (stolons) leafy.

Leaves: Basal leaves round to kidney-shaped, 5-10 (12) mm wide, shallowly 3- to 7-lobed, not noticeably veined, sometimes sparsely hairy above near sinuses, the stalks 1-2 cm long, smooth; stem leaves 1 to 4, egg- to nearly kidney-shaped, shallowly lobed, smooth.

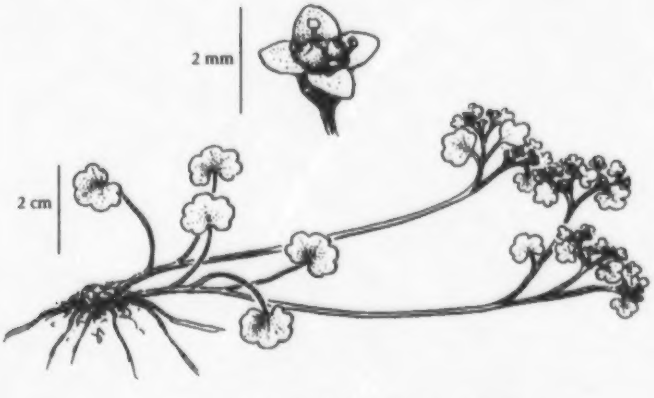
Flowers: Inflorescence terminal, of clusters of 3 to 10 flowers, the flowers top-shaped, 2-3 mm across; bracts green but often purple-dotted, egg-shaped, slightly lobed to entire; petals lacking; calyces joined to lower half of ovaries (the hypanthium), the lobes 4, oval, erect, mostly green, sometimes tinged with purple, obscurely 1-veined, triangular to egg-shaped, 1 mm long and about as wide, the two pairs alike; stamens 4 (3), opposite sepals; styles 0.2-0.3 mm long, the disk absent.

Fruits: Capsules, the free portion 2-lobed, top- to bell-shaped; seeds smooth, 0.6-0.8 mm long, light reddish-brown.

Notes: Included by some authors in *C. alternifolium* L., but it is quite distinct (Packer 1991).



Chrysosplenium iowense



Chrysosplenium tetrandrum

***Chrysosplenium wrightii* Franch. & Savigny**

Wright's golden-saxifrage; Wright's golden carpet

HABITAT/RANGE:

Wet seepage, solifluction and scree slopes in the alpine zone; rare in NW BC, known only from Squaw Creek, Haines Triangle; amphiberingian, N to AK, YT and NT; NE Asia.

DESCRIPTION:

General: Perennial herb from thick rhizomes; stems succulent, usually erect, 2-10 cm tall/long, simple or branched, sparsely soft-hairy.

Leaves: Basal leaves round- to kidney-shaped, 4-9 mm long, 2-14 mm wide, with 5 to 9 broad, round teeth, thick, heart-shaped at base, smooth or with thick white hairs; slender-stalked, the stalks with reddish-brown crinkly hairs; stem leaves similar, few.

Flowers: Inflorescence a few-flowered, terminal cluster, the flowers inconspicuous; bracts unstalked, or nearly so; petals lacking; calyces joined to lower half of ovaries (the hypanthium); sepals 4, broadly rounded, mottled-purple; stamens 8.

Fruits: Capsules, the free portion 2-lobed; seeds smooth.

ELMERA

Elmera racemosa* (S. Wats.) Rydb var. *racemosa

elmera

HABITAT/RANGE:

Mesic rock crevices and cliffs in the subalpine and alpine zones; rare in SW BC; S to S WA.

DESCRIPTION:

General: Perennial herb from slender, horizontal rhizomes; stems erect, 10-25 cm tall; plants abundantly hairy, glandular-hairy above.

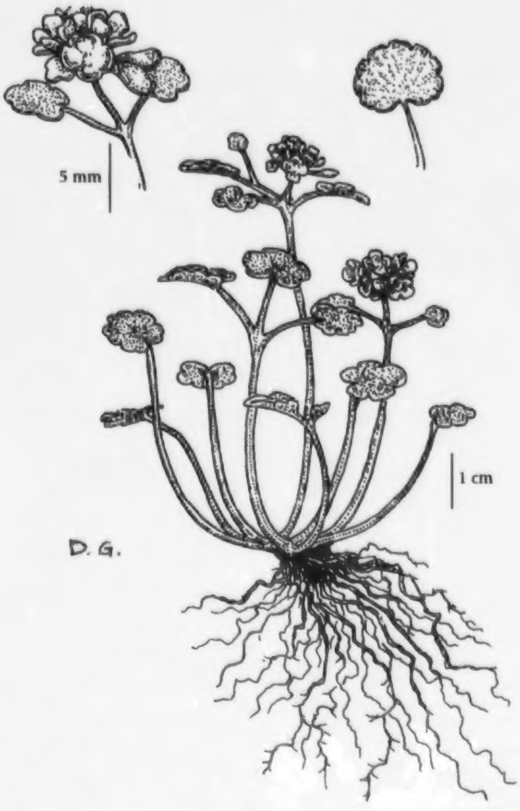
Leaves: Basal leaves kidney-shaped, 3-5 cm wide, wider than long, palmately slightly-lobed, with single- or double-toothed margins, long-stalked; stem leaves similar, usually 2 or 3, shorter-stalked; stipules large, membranous, brownish.

Flowers: Inflorescence a 10- to 35-flowered, terminal raceme; bracts small, fringed, brownish; petals white, the short claw about equal to the 3- to 7-lobed blade; calyces greenish-yellow, cup-shaped, joined to ovary only at the base, the free hypanthium tubular, 3-4 mm long, lined with a thin glandular disk, calyx lobes 4, triangular-egg-shaped, erect to sometimes spreading; stamens 5, opposite to calyx lobes.

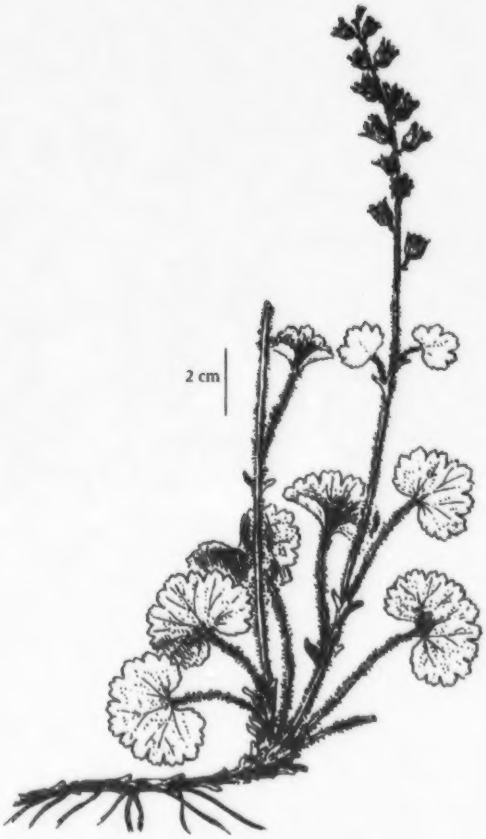
Fruits: Capsules, egg-shaped, 4-5 mm long, the beaks about 0.5 mm long; seeds dark brown, about 0.6 mm long.

HEUCHERA

1. Panicle open to highly diffuse; stamens exserted.
   2. Calyces 5-10 mm long (as measured from the tip of the flower stalk), seldom as wide .... *H. richardsonii*
   2. Calyces 1.5-3.0 mm long (as measured from the tip of the flower stalk), and nearly as wide.
      3. Leaf blades (as measured from the basal sinus) almost always wider than long; leaf stalks smooth or occasionally glandular short-hairy; stipules fringed; seeds brown, 3-4 times longer than wide .... *H. glabra*
      3. Leaf blades (as measured from the basal sinus) mostly longer than wide; leaf stalks usually long-hairy, with white or brownish hairs, rarely smooth or glandular short-hairy; stipule margins long-hairy; seeds black, less than twice as long as wide .... *H. micrantha*
1. Panicle narrow, congested; stamens not exserted.
   4. Stamens 2.3-3.2 mm long, filaments about 3 times the length of the anthers; sepals bright green .... *H. chlorantha*
   4. Stamens 1.0-2.5 mm long; filaments 1-2 times the length of the anthers; sepals cream to yellow .... *H. cylindrica*



Chrysosplenium wrightii



Elmera racemosa var. *racemosa*

Heuchera chlorantha **Piper**
meadow alumroot

HABITAT/RANGE:

Mesic to moist grassy bluffs, streambanks, meadows, rocky river banks, roadsides and forest margins in the lowland and montane zones; infrequent on the Queen Charlotte Islands, WC BC, S Vancouver Island and the adjacent mainland; S to ID and CA.

DESCRIPTION:

General: Perennial herb from short, thick rhizomes; stems erect, 40-100 cm tall, conspicuously long-soft-hairy below, glandular-hairy above.

Leaves: Basal leaves heart-egg- to almost kidney-shaped, 4-8 cm wide, not quite as long, palmately 5- to 9-lobed, the lobes shallow, broadly rounded, doubly-toothed; long-stalked, the stalks densely hairy; stem leaves lacking; stipules membranous, fused to the leaf stalks.

Flowers: Inflorescence spike-like, densely-flowered, to 15 cm long; bracts membranous; petals white to greenish-yellow, often absent or partly absent, clawed, less than half length of sepals, the blades linear to broadly spoon-shaped; calyces green to greenish-yellow, narrowly bell-shaped, joined to ovary almost to top, the free hypanthium slightly lop-sided, about as long as part joined to ovary, lined with a thick glandular disk, calyx lobes 5, nearly equal, oblong, about as long as rest of calyx, tips blunt to rounded; stamens 5, opposite the calyx lobes.

Fruits: Capsules, 9-11 mm long, opening along the beaks; seeds dark brown, 0.7-0.8 mm long, with lengthwise rows of slender spines.

Heuchera cylindrica **Dougl. *ex* Hook.**
round-leaved alumroot

HABITAT/RANGE:

Dry to mesic rocky places, cliffs and talus slopes from the lowland to alpine zones; common in S BC in and E of the Coast-Cascade Mountains; E to SW AB and S to WY, ID, NV and OR.

DESCRIPTION:

General: Perennial herb from short, thick rhizomes; stems erect, 15-90 cm tall, smooth to finely glandular-hairy or stiff-hairy below, glandular-hairy above, naked or with 1 to 3 brownish or greenish bracts.

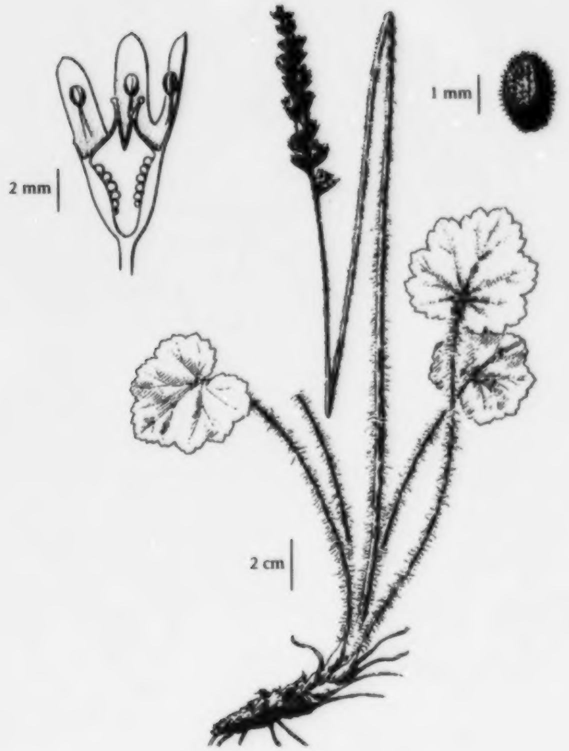
Leaves: Basal leaves egg-shaped to nearly heart- or kidney-shaped, 1-6 cm wide, shorter or longer than wide, palmately-lobed, the lobes round-toothed, smooth or finely glandular-hairy to stiff-hairy; long-stalked, the stalks smooth to minutely glandular short-hairy or with conspicuous white hairs intermixed with short glandular hairs; stem leaves lacking; stipules membranous, fused to the leaf stalks.

Flowers: Inflorescence spike-like, becoming open, 3-12 (20) cm long; petals white to greenish-yellow, 5, often absent or partly absent, linear, much shorter than calyx lobes; calyces greenish-yellow to cream-coloured, narrowly bell-shaped, joined to ovary almost to top, the free hypanthium slightly to strongly lop-sided, equal to or longer than part joined to ovary, lined with a thin to thick, somewhat glandular disk, calyx lobes 5, oblong-lanceolate to egg-shaped and overlapping, erect, longer than the hypanthium; stamens 5, opposite and shorter than calyx lobes.

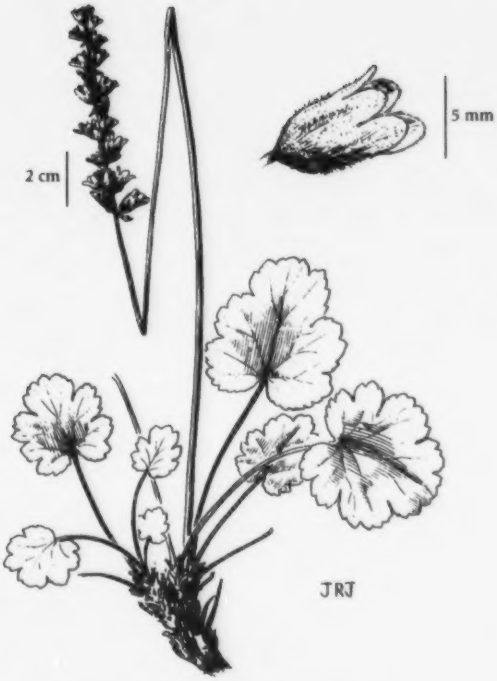
Fruits: Capsules, 6-10 mm long, opening along the beaks; seeds dark brown, 0.6-0.9 mm long, with lengthwise rows of slender, straight to curved spines.

Notes: Four intergrading and largely sympatric varieties occur in BC:

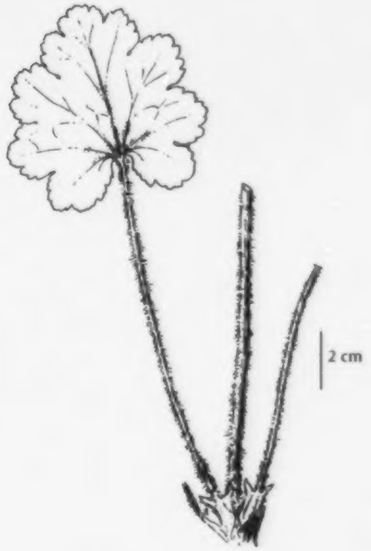
1. Leaf stalks smooth to minutely glandular-short-hairy; plants mainly of SE BC.
    2. Largest leaves 3.2-8.0 cm long, the teeth not or only slightly mucronate .... var. *glabella* (T.& G.) Wheelock
    2. Largest leaves 2.2-4.8 cm long, the teeth usually strongly mucronate .... var. *septentrionalis* Rosend., Butters & Lakela
1. Leaf stalks generally with conspicuous white hairs intermixed with short glandular hairs; plants mainly of SC BC.
    3. Largest leaves 3.0-8.5 cm long, the bases slightly to strongly heart-shaped .... var. *cylindrica*
    3. Largest leaves 2.0-6.0 cm long, the bases squared-off or slightly heart-shaped .... var. *orbicularis* (Rosend., Butters & Lakela) Calder & Savile



Heuchera chlorantha



Heuchera cylindrica var. *glabella*



Heuchera cylindrica var. *cylindrica*

***Heuchera glabra* Willd. *ex* Roem. & Schult.**

smooth alumroot

HABITAT/RANGE:

Moist rock crevices, rocky meadows, streambanks and talus slopes from the montane to alpine zones; frequent in S BC, infrequent northwards and absent in NE BC; N to AK, E to SW AB and S to N OR.

DESCRIPTION:

General: Perennial herb from well-developed, horizontal to ascending rhizomes, clothed with old, brown leaf-bases and stipules; stems 1 to several, erect, 15-60 cm tall, smooth to finely glandular-hairy below, strongly glandular-hairy in the inflorescence.

Leaves: Basal leaves heart-egg-shaped, 3-9 (14) cm wide, shorter than wide, palmately 5-lobed 1/3 to 1/2 to base, the lobes shallowly lobed and coarsely toothed, sparsely glandular-hairy below, smooth above, the stalks long; stem leaves 1 or 2, greatly reduced, the upper bract-like; stipules membranous, fused to the leaf stalks.

Flowers: Inflorescence an open, many-flowered cluster, the branches and flower-stalks thread-like, the bracts linear; petals white, 5, 2- to 4-times longer than sepals, clawed, the claws slender, blades diamond- to spoon-shaped; calyces greenish-yellow, cone-shaped, glandular-hairy, joined to ovary almost to top, the free hypanthium less than 0.5 mm long; calyx lobes 5, oblong-egg-shaped, about 2/3 length of lower portion; stamens 5, longer than calyx lobes.

Fruits: Capsules, 5-6 mm long, egg-shaped, opening along the beaks; seeds brown, 0.7-0.8 mm long, with lengthwise rows of about 20 spines.

***Heuchera micrantha* Dougl. *ex* Lindl. var. *diversifolia* (Rydb.) Rosend., Butters & Lakela**

small-flowered alumroot

HABITAT/RANGE:

Moist to dry streambanks, rock crevices and talus slopes from the lowland to subalpine zones; infrequent in NW BC, frequent on Vancouver Island and the adjacent mainland; S to WA and CA.

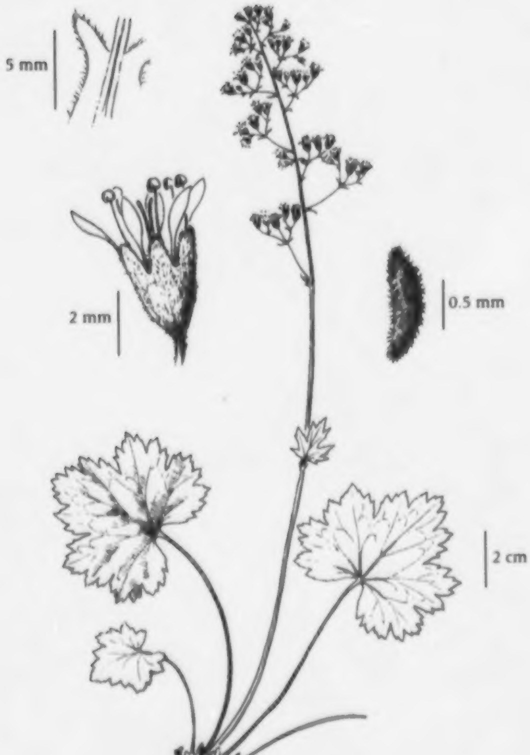
DESCRIPTION:

General: Perennial herb from well-developed, horizontal to ascending rhizomes, clothed with old, brown leaf-bases and stipules; stems 1 to several, erect, 15-60 cm tall, long soft-hairy below, strongly glandular-hairy in the inflorescence.

Leaves: Basal leaves kidney- to heart-egg-shaped, 3-8 cm wide, either shorter than wide with 5 to 7 rounded, shallow lobes, or longer than wide with pointy lobes cleft 1/3 their length, stiff-hairy below, sometimes also above, stalked, the stalks long, sparsely to densely hairy or rarely smooth; stem leaves 1 or 2, greatly reduced, the upper bract-like; stipules membranous, fused to the leaf-stalks.

Flowers: Inflorescence an open, many-flowered cluster, the branches and flower-stalks thread-like, the bracts linear; petals white, 5, 2- to 4-times longer than sepals, clawed, the claws slender, blades diamond- to spoon-shaped; calyces greenish-yellow, bell-shaped, long-soft-hairy, joined to ovary almost to top, the free hypanthium about 0.5 mm long; calyx lobes 5, oblong-egg-shaped, about 2/3 length of lower portion; stamens 5, longer than calyx lobes.

Fruits: Capsules, 5-6 mm long, egg-shaped, opening along the beaks; seeds deep brownish-purple, 0.6-0.7 mm long, with lengthwise rows of 25-30 spines.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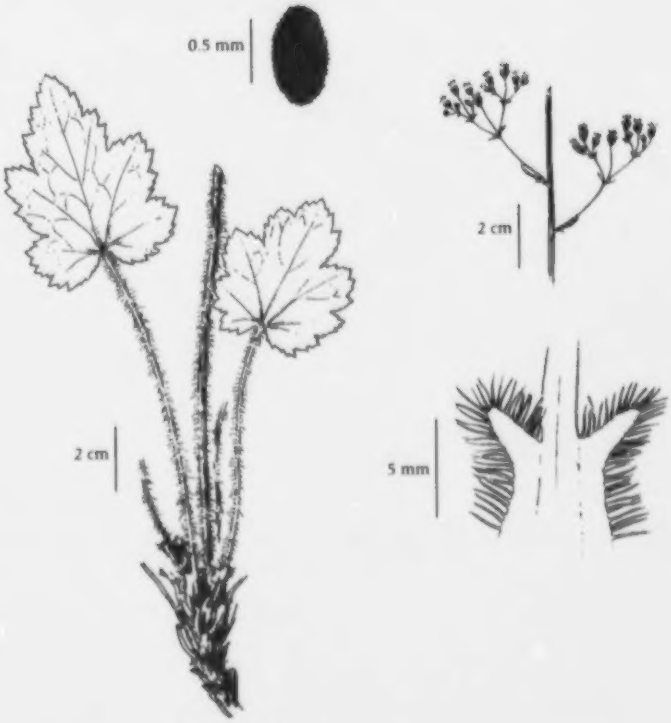
2 cm

Heuchera glabra


0.5 mm
2 cm
2 cm
5 mm

Heuchera micrantha var. *diversifolia*

Heuchera richardsonii **R. Br.**

Richardson's alumroot

HABITAT/RANGE:

Dry sandy grasslands, gravelly lake shores and slopes in the montane zone; locally frequent in NE BC; N to NT, E to ON and S to IN, MO, OK and CO.

DESCRIPTION:

General: Perennial herb from stout, branched stem-bases; stems erect, 40-70 cm tall, somewhat stiff-hairy below, with white hairs, glandular-hairy above.

Leaves: Basal leaves heart-kidney-shaped, 3-6 cm wide, palmately 7- to 9-lobed, the lobes shallow, toothed, somewhat whitish-hairy below, usually smooth above, stalked, the stalks long, hairy; stem leaves lacking; stipules membranous, fused to the leaf-stalks.

Flowers: Inflorescence a narrow, many-flowered cluster; petals purplish, 5, clawed, blades spoon-shaped, equal to or slightly longer than sepals; calyces greenish, strongly glandular-hairy, cylinder bell-shaped, joined to ovary to halfway, the free hypanthium lop-sided, 2-4 mm long on one side, less than half that on other; calyx lobes 5, oblong, erect, about length of hypanthium; stamens 5, slightly longer than calyx lobes.

Fruits: Capsules, opening along the beaks; seeds dark brown, 0.7 mm long, spiny.

LEPTARRHENA

Leptarrhena pyrolifolia **(D. Don) R. Br. *ex* Ser.**

leatherleaf saxifrage

HABITAT/RANGE:

Moist to wet streambanks and meadows in the montane to alpine zones; frequent throughout BC, except absent in the NE; N to AK, YT and NT, E to AB and S to MT, ID and OR.

DESCRIPTION:

General: Perennial herb from spreading, horizontal or ascending rhizomes; stems erect, 10-40 cm tall, glandular-hairy above.

Leaves: Basal leaves leathery, narrowly egg-shaped to elliptic, 3-15 cm long, round-toothed, narrowed at base to a short, broad stalk less than 1/2 length of blade, deep green and shining above, pale green or brownish below, smooth; stem leaves 1 to 3, widely separated, smaller, unstalked, mostly oblong-oblanceolate; stipules membranous, fused to the leaf stalks.

Flowers: Inflorescence terminal, of several, many-flowered clusters, compact at first, expanding in fruit; petals white or pinkish, 5, clawed, blades spoon-shaped, up to twice length of sepals; calyces deeply saucer-shaped, 2-3 mm wide, joined to ovary only at the base, the free hypanthium lacking; calyx lobes 5, erect, about 1 mm long; stamens 10.

Fruits: Follicles, 2, 5-7 mm long, reddish or purplish; seeds light brown, 2-3.5 mm, tailed at both ends.

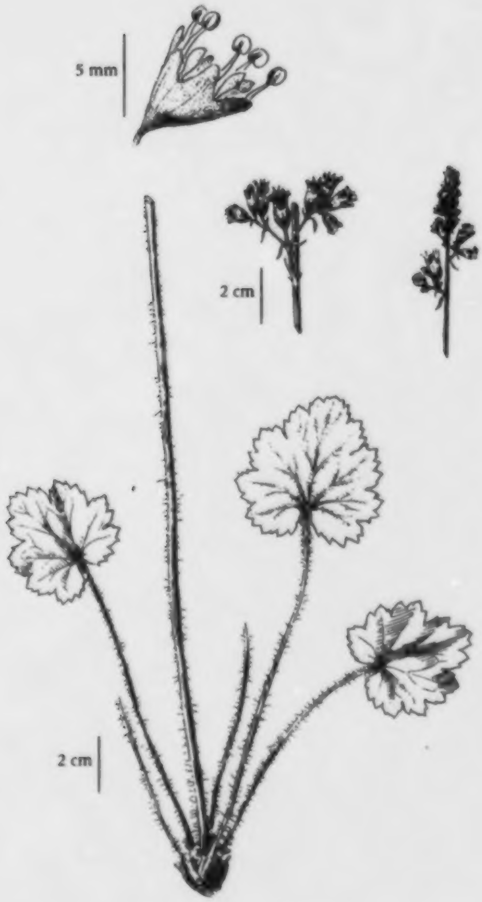
LITHOPHRAGMA

1. Seeds with tiny spines; entire surface of the stigmas with pimples; petals 5-parted, the sinuses extending 4/5 or more to the base; flowers often replaced by bulblets .... *L. glabrum*

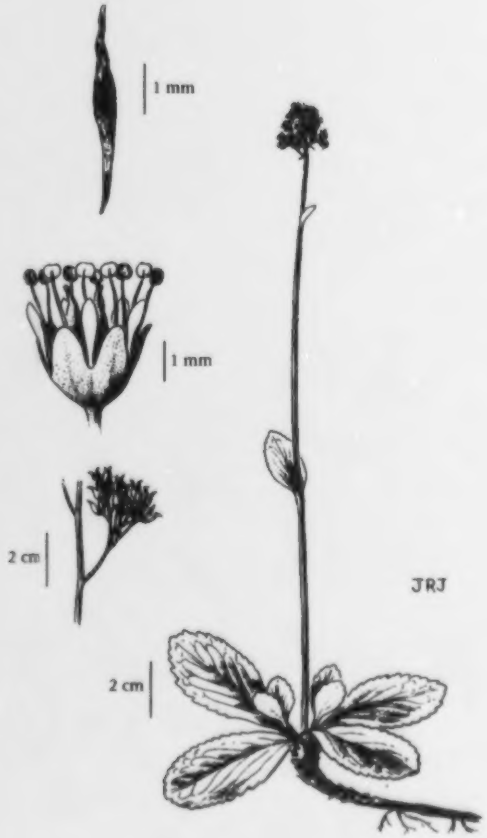
1. Seeds without tiny spines; only the margins of the stigmas with pimples; petals 3-parted or 5 (7)-parted, the sinuses extending only 1/3-1/2 to the base; flowers rarely replaced by bulblets.

    2. Ovaries completely inferior; petals 3-parted, 7-16 mm long; leaves dark or reddish-green, sparsely to densely hairy .... *L. parviflorum*

    2. Ovaries less than half-inferior; petals 5(7)-parted, 3-7 mm long; leaves light green, sparsely hairy .... *L. tenellum*



Heuchera richardsonii


1 mm
1 mm
2 cm
2 cm
JRJ

Leptarrhena pyrolifolia

Lithophragma glabrum **Nutt. (*L. bulbiferum* Rydb.)**
smooth fringecup; smooth woodland star

HABITAT/RANGE:

Mesic to dry coastal bluffs, meadows, open coniferous and deciduous forests, grasslands and shrublands in the lowland and steppe to subalpine zones; frequent in S BC; E to SK and S to SD, CO, UT, NV and CA.

DESCRIPTION:

General: Perennial herb from slender rhizomes, with small bulblets; stems erect, 5-25 cm tall, lightly to heavily glandular-hairy throughout, the hairs usually purple-tipped.

Leaves: Basal leaves round to kidney-shaped, 1-2 cm wide, palmately cleft to the base into (3) 5 segments, these again 3-lobed, smooth or sparsely hairy, often with bulblets in axils; stalks slender, 1-2.5 cm long, with widened stipular bases; stem leaves usually 2, similar to basal or with narrower segments.

Flowers: Inflorescence a 2- to 5-flowered cluster; petals pinkish or purplish-tinged, 5, clawed, the blades wedge egg-shaped, to 8 mm long, usually 5-cleft, the segments often again deeply divided; calyces bell-shaped, 3-4 mm long (up to 6 mm long in fruit), joined to ovary to about 1 mm, the free hypanthium spreading slightly; calyx lobes 5, triangular, 0.5-1 mm long, tips blunt to rounded; stamens 10.

Fruits: Capsules; seeds brownish, about 0.5 mm long, with tiny spines.

Lithophragma parviflorum **(Hook.) Nutt. *ex* Torr. var. *parviflorum***
small-flowered fringecup; small-flowered woodland star

HABITAT/RANGE:

Mesic to dry coastal bluffs, meadows, open coniferous and deciduous forests, grasslands and shrublands in the lowland and steppe to montane zones; frequent in extreme S BC; E to AB and S to NE, CO, UT, NV and CA.

DESCRIPTION:

General: Perennial herb from slender rhizomes, with small bulblets; stems erect, 10-30 cm tall, densely glandular-hairy throughout, noticeably purplish above.

Leaves: Basal leaves round-to kidney-shaped, 1-3 cm wide, palmately 3- to 5-divided nearly to the base, then again 2- to 3-times lobed, teeth more or less pointed; stalks slender, 2-6 cm long, with widened stipular bases; stem leaves 2 (1-3), more divided than basal, unstalked above.

Flowers: Inflorescence a 5- to 11-flowered cluster; petals white or pinkish to purplish, 5, usually unequal, 5-10 mm long, clawed, the blades wedge egg-shaped, usually 3-cleft; calyces cone-shaped, 4-6 mm long (up to 10 mm long in fruit), part joined to ovary greater than the free hypanthium; calyx lobes 5, triangular egg-shaped, 1-2 mm long, almost as wide; stamens 10.

Fruits: Capsules, about length of calyces when mature; seeds brown, elliptic, about 0.5 mm long, irregularly veiny and ridged lengthwise.

Lithophragma tenellum **Nutt.** (*L. tenellum* var. *thompsonii* [Hoover] C.L. Hitchc., *L. thompsonii* Hoover)
slender fringecup; slender woodland star

HABITAT/RANGE:

Dry, open meadows, coniferous and deciduous forests, grasslands and shrublands in the steppe to montane zones; infrequent in SC BC; S to NM, AZ and CA.

DESCRIPTION:

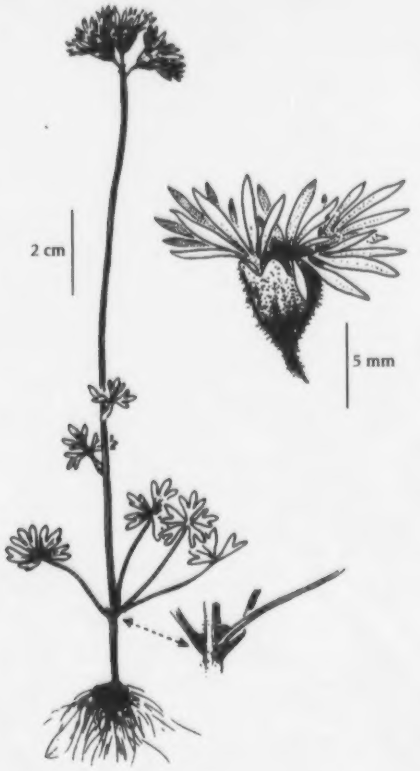
General: Perennial herb from slender rhizomes, with small bulblets; stems erect, 10-25 cm tall, densely glandular-hairy throughout with yellow-tipped hairs.

Leaves: Basal leaves nearly round to kidney-shaped, 0.5-1.5 cm wide, palmately 3-divided or -lobed, the lobes shallowly toothed, or simply 3- to 7-toothed, long-hairy, the teeth rounded; stalks slender, 1- to 2-times as long as blades, with widened stipular bases; stem leaves 2 or 3, unstalked above, more dissected than basal.

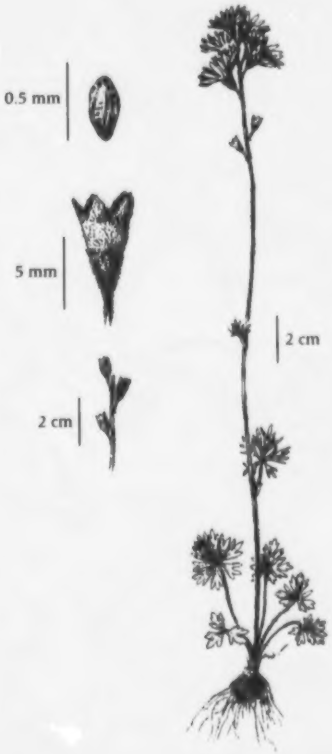
Flowers: Inflorescence a 5- to 10-flowered cluster; petals white or pinkish, 5, clawed, the blades 5- to 7-lobed, the outer lobes smaller, 3-5 mm long; calyces narrowly bell-shaped, 2-3 mm long (up to 5 mm long in fruit), part joined to ovary less than the free hypanthium; calyx lobes 5, triangular, 0.5-1 mm long, tips blunt to rounded; stamens 10.

Fruits: Capsules, about length of calyces when mature; seeds brown, elliptic, about 0.5 mm long, wrinkled or veiny to almost smooth.

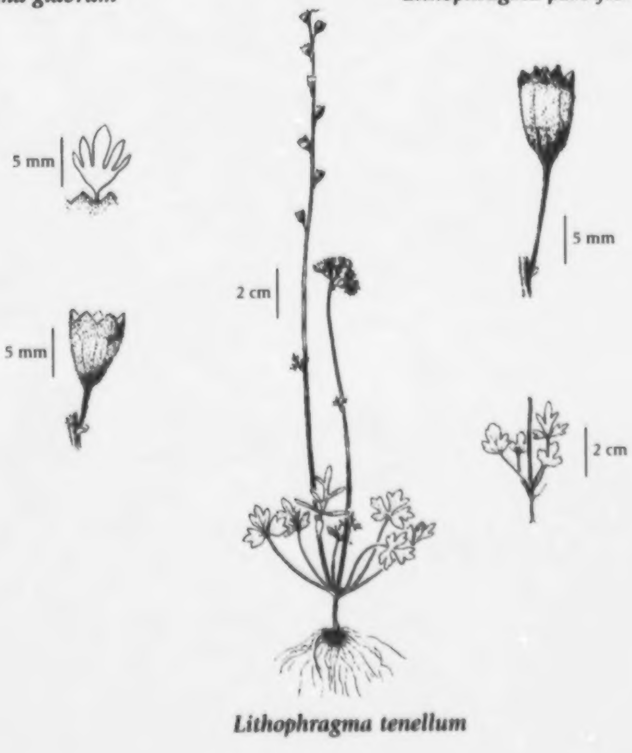
Notes: Some BC specimens have been recognized as *L. thompsonii* but this taxon is of dubious merit.



Lithophragma glabrum


0.5 mm
5 mm
2 cm
2 cm

Lithophragma parviflorum var. *parviflorum*


5 mm
2 cm
5 mm
5 mm
2 cm

Lithophragma tenellum

MITELLA

1. Stamens 10 .... *M. nuda*
1. Stamens 5.
    2. Stamens opposite the petals .... *M. pentandra*
    2. Stamens opposite the sepals.
        3. Stems with 1 to 3 leaves; styles about 1 mm long; flowers blooming from the top of the inflorescence down .... *M. caulescens*
        3. Stems usually leafless; styles much less than 1 mm long; flowers blooming from the bottom of the inflorescence up.
            4. Calyces cup-shaped, the lobes more or less erect; petals three-lobed (occasionally entire) .... *M. trifida*
            4. Calyces saucer-shaped, the lobes spreading and recurved; petals dissected into 5 to 9, linear segments.
                5. Leaf blades 4-8 cm wide, usually wider than long (as measured from the basal sinus); leaf stalks with an abundance of long, flexuous, brownish hairs; plants of S BC ...... *M. breweri*
                5. Leaf blades 1.5-3.5 cm wide, usually longer than wide (as measured from the basal sinus); leaf stalks lacking long flexuous, brownish hairs, except near the leaf blade; plants of S Vancouver Island .... *M. ovalis*

Mitella breweri **A. Gray**

Brewer's mitrewort

HABITAT/RANGE:

Moist to mesic meadows, streambanks and forests in the montane and subalpine zones; locally frequent in S BC north to 53° N; E to AB and S to MT, ID, NV and CA.

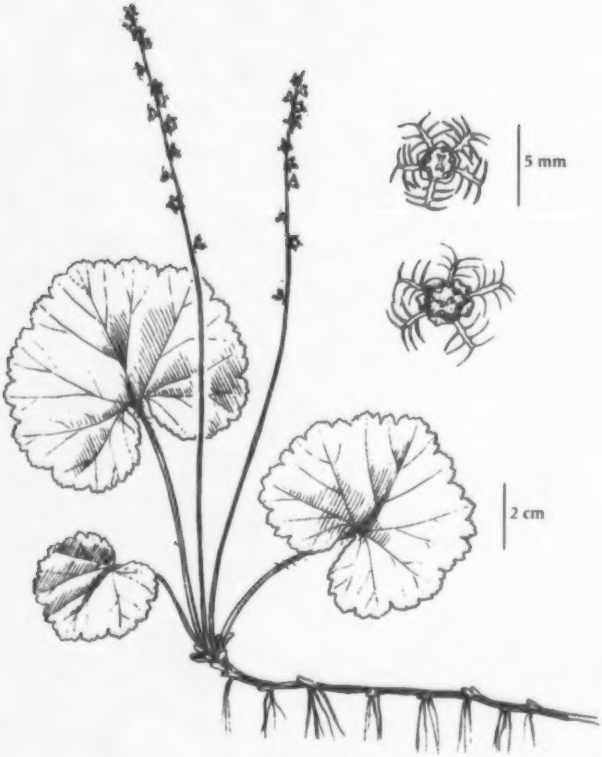
DESCRIPTION:

General: Perennial herb from slender rhizomes; stems erect, 15-30 cm tall, leafless or with membranous bracts, smooth or sparsely brown-soft-hairy below, densely fine-glandular-hairy above.

Leaves: Basal leaves more or less round, 3-8 cm wide, shallowly 7- to 11-lobed, round-toothed, bases slightly kidney-shaped, smooth to whitish- or brownish-hairy; long-stalked; stem leaves lacking.

Flowers: Inflorescence a 20- to 60-flowered spike-like cluster, blossoming upward, flower stalks 1-2.5 mm long; petals greenish-yellow, the claw slender, the blades dissected into 5 to 9 linear, mostly opposite segments; calyces saucer-shaped, 3-3.5 mm wide, joined to ovary for part of length; free hypanthium thinly gland-lined, somewhat spreading, about length of lobes; calyx lobes 5, triangular; stamens 5, opposite the calyx lobes.

Fruits: Capsules; seeds black, veiny-pitted.



Mitella breweri

***Mitella caulescens* Nutt.**

leafy mitrewort

HABITAT/RANGE:

Wet to moist meadows and woodlands in the lowland and montane zones; rare on S Vancouver Island and the lower Fraser Valley; S to ID, MT, ID and CA.

DESCRIPTION:

General: Perennial herb from slender rhizomes; stems erect, 20-40 cm tall, glandular-hairy, sparsely leafy.

Leaves: Basal leaves heart-shaped, 2-7 cm wide, usually 5-lobed about 1/4 to 1/3 their length, sharp-toothed, sparsely coarse-hairy, at least above, long-stalked; stem leaves 1 to 3, similar to the basal but much reduced.

Flowers: Inflorescence a loosely flowered spike-like cluster of up to 25 flowers, blossoming from top downward, the flower stalks 2-8 mm long; petals yellow-green, the claw slender, the blades dissected into 8 (4-7) linear, opposite, and usually glandular segments; calyces broadly bell-shaped, greenish, 5-6 mm wide, joined to ovary for about 1/3 length; free hypanthium thinly gland-lined, somewhat spreading, about length of lobes; calyx lobes 5, alternate with petals, triangular-egg-shaped; stamens 5, opposite the calyx lobes.

Fruits: Capsules; seeds black, veiny-pitted.

***Mitella nuda* L.**

common mitrewort; bare-stemmed mitrewort

HABITAT/RANGE:

Moist to wet streambanks, meadows, thickets, swamps and forests in the lowland and montane zones; common throughout BC east of the Coast-Cascade Mountains; amphiberingian, N to SE AK, S YT and SW NT, E to NF and S to NH, PA, MI, IO, ND, MT and WA.

DESCRIPTION:

General: Perennial herb from slender rhizomes, usually with stolons; stems erect, 3-20 cm tall, finely glandular-hairy, leafless or with a simple unstalked leaf near the base.

Leaves: Basal leaves heart- to kidney-shaped, 1-3 cm long, doubly round-toothed, sparsely hairy, at least above, long-stalked; stem leaves, if present, reduced, unstalked, occurring near the stem-base.

Flowers: Inflorescence a loosely flowered spike-like cluster of 3 to 12 flowers, blossoming upward, the flower stalks 2-6 mm long; petals greenish-yellow, about 4 mm long, the claw slender, the blades dissected into 8 linear, opposite segments; calyces broadly bell- to saucer-shaped, tubular portion joined to ovary; free hypanthium almost absent; calyx lobes 5, egg-shaped, blunt to pointed; stamens 10.

Fruits: Capsules; seeds black, veiny-pitted.

***Mitella ovalis* Greene**

oval-leaved mitrewort

HABITAT/RANGE:

Wet to moist woodlands and streambanks in the lowland zone; locally common on S Vancouver Island; S to CA.

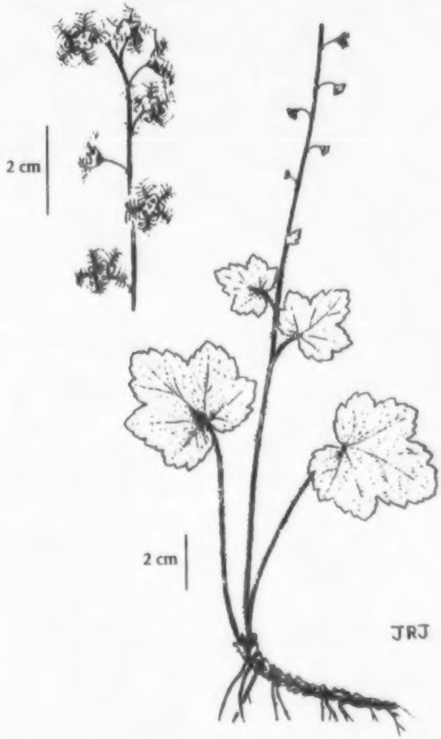
DESCRIPTION:

General: Perennial herb from slender rhizomes; stems erect, 15-30 cm tall, brownish- to whitish-hairy below, glandular and fine-hairy above, leafless.

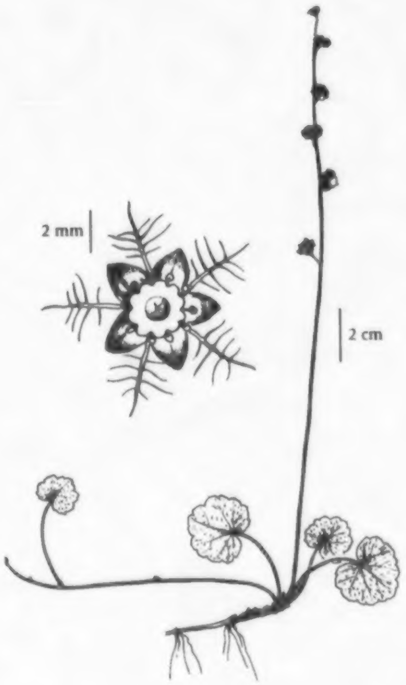
Leaves: Basal leaves egg-shaped, with heart-shaped bases, 1.5-3.5 cm wide, up to 1.5 times as long, shallowly 5- to 9-lobed, shallowly doubly toothed, brownish- to whitish-hairy, long-stalked; stem leaves usually absent.

Flowers: Inflorescence a closely-flowered spike-like cluster of 20 to 60 flowers, blossoming upward, the flower stalks stout, to 2 mm long; petals greenish-yellow, the claw slender, the blades dissected into 4 to 7 linear, unpaired segments; calyces saucer-shaped, 2.5-3.5 mm wide, greenish-yellow, joined to ovary for about 1/3 length; free hypanthium thinly gland-lined, somewhat spreading, about length of lobes; calyx lobes 5, triangular, spreading to bent back; stamens 5, opposite the calyx lobes.

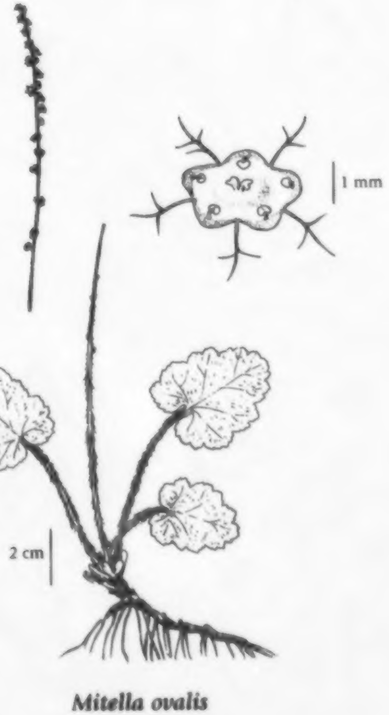
Fruits: Capsules; seeds black, veiny-pitted.



Mitella caulescens



Mitella nuda



Mitella ovalis

Mitella pentandra **Hook.**

five-stamened mitrewort

HABITAT/RANGE:

Moist to wet woodlands, streambanks, meadows, avalanche tracks and talus slopes from the montane to alpine zones; frequent throughout BC except NE BC; N to AK and YT, E to AB and S to SD, CO, UT, NV and CA.

DESCRIPTION:

General: Perennial herb from slender rhizomes, sometimes with stolons; stems erect, 20-40 cm tall, glandular- or fine glandular-hairy to almost smooth.

Leaves: Basal leaves egg-shaped with heart-shaped bases, 2-5 cm wide, slightly longer, shallowly 5- to 9-lobed, doubly sharp-toothed, nearly smooth to stiff-hairy, long-stalked; stem leaves absent or of 1 or 2 membranous bracts.

Flowers: Inflorescence a spike-like cluster of 6 to 25 flowers, blossoming upward, the flower stalks 2-7 mm long; petals greenish, 2-3 mm long, the claw slender, the blades dissected into 8 (4-10) linear, opposite segments; calyces saucer-shaped, 3-4 mm wide, joined to ovary for part of length; free hypanthium thinly gland-lined, somewhat spreading; calyx lobes 5, triangular, spreading to bent back; stamens 5, opposite the petals.

Fruits: Capsules; seeds black, veiny-pitted.

Mitella trifida **R.C. Grah.**

three-toothed mitrewort

HABITAT/RANGE:

Moist woodlands, forests and open slopes in the montane zone; locally frequent on S Vancouver Island and S BC, disjunct and infrequent in WC BC; N to AK, E to AB and S to MT, ID and CA.

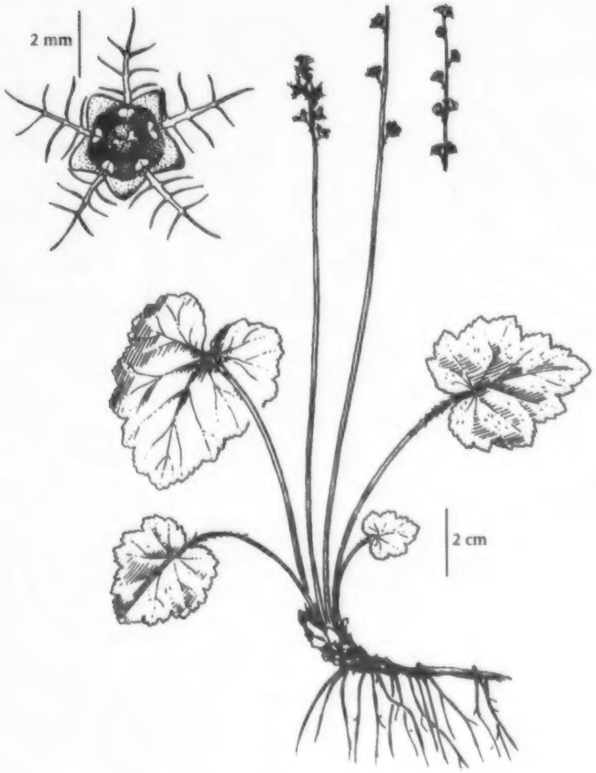
DESCRIPTION:

General: Perennial herb from slender rhizomes; stems erect, clustered, 15-35 cm tall, fine glandular-hairy to hairy.

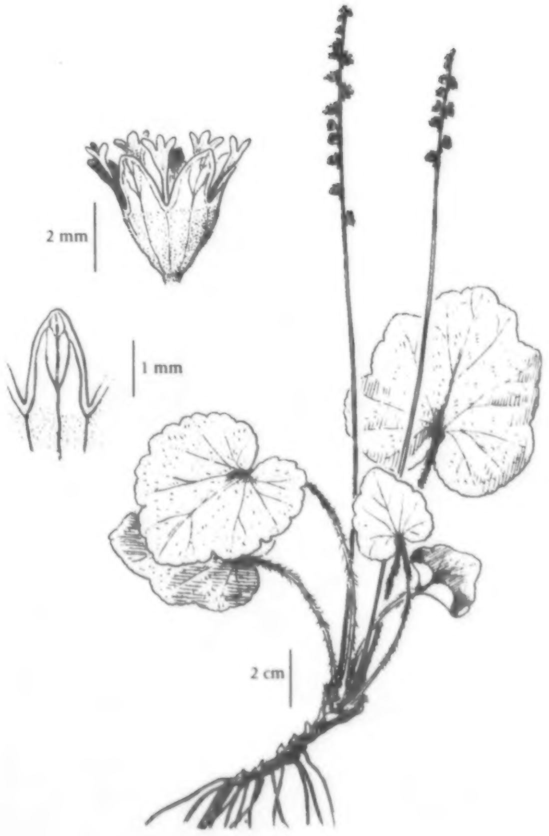
Leaves: Basal leaves nearly round, with heart-shaped bases, 2-6 cm wide, slightly shorter, indistinctly 5- to 7-lobed, round-toothed, long-stalked; stem leaves absent or of 1 or 2 membranous bracts.

Flowers: Inflorescence a closely-flowered spike-like cluster of 10 to 20 flowers, blossoming upward, the flower stalks stout, 0.5-2 mm long; petals white to purplish-tinged, clawed, the blades 3-lobed, the lobes elliptic; calyces broadly bell-shaped, 1.5-3 mm long, joined to ovary for part of length; free hypanthium thinly gland-lined, somewhat spreading; calyx lobes 5, oblong to egg-shaped, erect to spreading, thin, whitish or purplish-tinged; stamens 5, opposite the calyx lobes.

Fruits: Capsules; seeds black, veiny-pitted.



Mitella pentandra



Mitella trifida

SAXIFRAGA

1. Flowers purple; leaves opposite .... *S. oppositifolia*

1. Flowers not purple; leaves otherwise.

2. Flowers yellow (drying yellow in *S. bronchialis*).

3. Leaves fringed, with stiff bristle-like hairs.

4. Plants with conspicuous stolons .... *S. flagellaris*

4. Plants lacking stolons .... *S. bronchialis*

3. Leaves not fringed.

5. Sepals reflexed; petals clawed; leaves egg-shaped .... *S. serpyllifolia*

5. Sepals erect or spreading; petals clawless; leaves linear or lanceolate.

6. Flowers usually solitary, 10-15 mm across; leaves 1-4 mm long .... *S. hirculus*

6. Flowers several, 5-10 mm across; leaves 5-15 mm long .... *S. aizoides*

2. Flowers greenish, white or pink.

7. Bulblets present basally, or in the axils of the leaves and/or the inflorescence, where they often replace flowers.

8. Leaves distinctly stalked, the blades round-to kidney-shaped, about as long as wide.

9. Flowers normal; bulblets basal .... *S. rivularis*

9. Flowers partially or mostly replaced by bulblets.

10. Inflorescence diffuse, the branches often arching and each usually with a terminal flower; basal leaves (2) 3-10 cm wide .... *S. mertensiana*

10. Inflorescence a raceme, with a single terminal flower; basal leaves 1-2 cm wide .... *S. cernua*

8. Leaves not distinctly stalked, the oblanceolate blades tapering basally to an indistinct stalk .... *S. ferruginea*

7. Bulblets absent.

11. Flowering stems with at least one and usually several leaves.

12. Leaves conspicuously fringed with stiff, bristle-like, nonglandular hairs.

13. Leaves 3-toothed, up to 5 mm long and nearly as wide as long; plants of N. Vancouver Island and Queen Charlotte Islands .... *S. taylori*

13. Leaves entire; plants occurring throughout BC except absent on the Queen Charlotte Islands .... *S. bronchialis*

12. Leaves not fringed with stiff, bristle-like nonglandular hairs.

14. Leaves with clearly distinct stalks and blades, the blades round to kidney-shaped, about as long as wide, 3- to 5-toothed .... *S. rivularis*

14. Leaves not as above; usually longer than wide, tapering at the bases and 3-lobed at the tips.

15. Basal leaves stiff, with 3 apical teeth tipped by rigid spines, the leaf margins glandular-hairy .... *S. tricuspidata*

15. Basal leaves not stiff, the apical teeth (lobes) not tipped by rigid spines, the leaf margins not glandular-hairy.

16. Plants annual, introduced in the Victoria area .... *S. tridactylites*

16. Plants perennial, native to BC.

17. Plants densely matted; leaves 3-lobed, the bases mostly 1.0-1.5 mm wide .... *S. caespitosa*

17. Plants not densely matted, the stems arising from a basal rosette; leaves oblanceolate to spoon-shaped, shallowly 3-lobed or entire, the bases more than 1.5 mm wide .... *S. adscendens*

11. Flowering stems leafless, or with only reduced bract-like leaves, mainly in the inflorescence.

18. Leaves entire (at most slightly wavy).

19. Plants small; flowering stems 3-8 cm high; leaves 3-10 (12) mm long .... *S. tolmiei*

19. Plants larger; flowering stems 10-30 (40) cm high; leaves 10-40 (120) mm long.

20. Petals more than 2 mm long, longer than the sepals; inflorescences conical, with open clusters on lateral branches; plants of SW BC .... *S. integrifolia*

20. Petals less than 2 mm long, as long as or shorter than the sepals; inflorescences cylindrical with compact clusters on several lateral branches; plants of SC BC .... *S. nidifica*

18. Leaves variously toothed or lobed.

21. Leaves with stalks 1- to 3-times longer than the blades; the blades round to kidney-shaped and distinctly toothed all around.

22. Petals narrowly to broadly elliptic, the bases wedge-shaped or only slightly clawed, unspotted .... *S. odontoloma*

22. Petals broadly elliptic to nearly round, conspicuously clawed, with two yellow or green spots near the base .... *S. nelsoniana*

21. Leaves with stalks much shorter or absent, the blades merely narrowing towards the base and toothed only at the tips.

23. Leaves fan-shaped or narrowly wedge-shaped.

24. Filaments club-shaped or spindle-shaped .... *S. lyallii*

24. Filaments linear or awl-like .... *S. razshivinii*

23. Leaves not fan-shaped, mostly lanceolate, egg-shaped, elliptic or diamond-shaped.

25. Inflorescences cylindric, spikelike, interrupted; petals green with a crimson tinge to very deep crimson; leaves smooth above, sparsely hairy below (the hairs nonglandular and with brownish-crimson crosswalls) .... *S. hieraciifolia*

25. Inflorescences globose, pyramidal and congested to open, widely spreading and flat-topped; petals white, often tinged with pink; leaves often short-hairy or densely hairy below.

26. Ovaries 1/2 or more inferior; inflorescences congested, even in fruit; leaves round to egg-shaped or diamond-shaped .... *S. nivalis*

26. Ovaries much less than 1/2 inferior; inflorescences generally more open, sometimes quite diffuse; leaves lanceolate to egg-shaped or elliptic.

27. Sepals strongly bent back; petals with two yellow spots at the base; ovaries completely superior .... *S. reflexa*

27. Sepals not strongly bent back; petals lacking yellow spots; ovaries partially inferior (up to 1/3).

28. Inflorescences open, flat-topped; leaves egg-shaped to occasionally diamond-shaped, with very regular teeth (resembling the cogs on a gear wheel), frequently densely rusty-woolly below .... *S. rufidula*

28. Inflorescences congested to open, but seldom flat-topped; leaves egg-shaped to frequently diamond-shaped, irregular teeth, generally not rusty woolly below .... *S. occidentalis*

***Saxifraga adscendens* L. ssp. *oregonensis* (Raf.) Bacig.**

wedge-leaved saxifrage

HABITAT/RANGE:

Moist cliffs, ledges and scree slopes in the alpine zone; frequent throughout BC, mostly in and E of the Coast-Cascade Mountains, absent from the Queen Charlotte Islands and adjacent coast; N to AK, YT and SW NT and S to CO, UT, NV and OR.

DESCRIPTION:

General: Perennial herb from taproots; stems erect, simple or branched, 2-10 cm tall; plants glandular-hairy.

Leaves: Basal leaves in a rosette, oblanceolate to egg-shaped, 5-15 mm long, entire to 3 (5)-toothed or shallowly lobed at tip, gradually narrowed to the stalk-like base, often reddish-purple; stem leaves alternate, similar to the basal, 3 to 10.

Flowers: Inflorescence a loosely-flowered spike-like cluster; petals white, deciduous, 2- to 3-times length of calyx lobes, clawed, the blades usually egg-shaped; calyces reddish-purple, bell-shaped, 2.5-3.5 mm long, joined to ovary for part of length; calyx lobes 5, triangular egg-shaped, erect, about length of free hypanthium; stamens 10.

Fruits: Capsules, 3.5-5 mm long; seeds egg-shaped, about 0.5 mm long, brownish-black, nearly smooth.

***Saxifraga aizoides* L.**

evergreen saxifrage; yellow saxifrage

HABITAT/RANGE:

Moist stream banks, gravel bars and talus slopes in the montane to alpine zones; frequent in N and E BC; circumpolar, N to SE YT and NT and E to NF; Greenland, Europe.

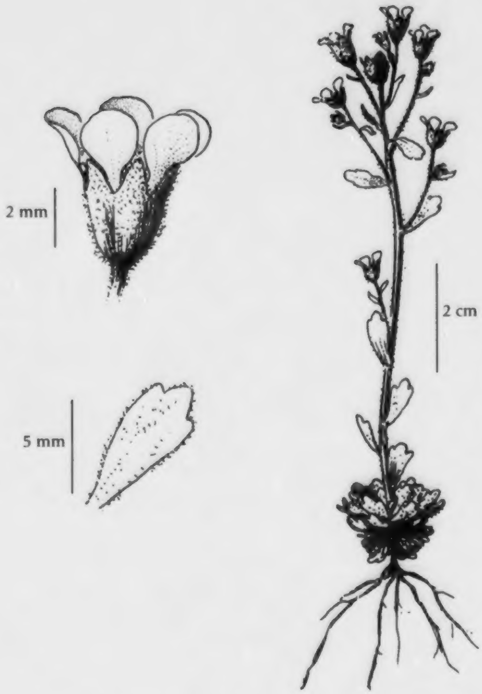
DESCRIPTION:

General: Perennial herb from branched stem-bases, matted; stems numerous, ascending to erect, the flowering stems 5-14 cm tall, glandular-hairy, at least above.

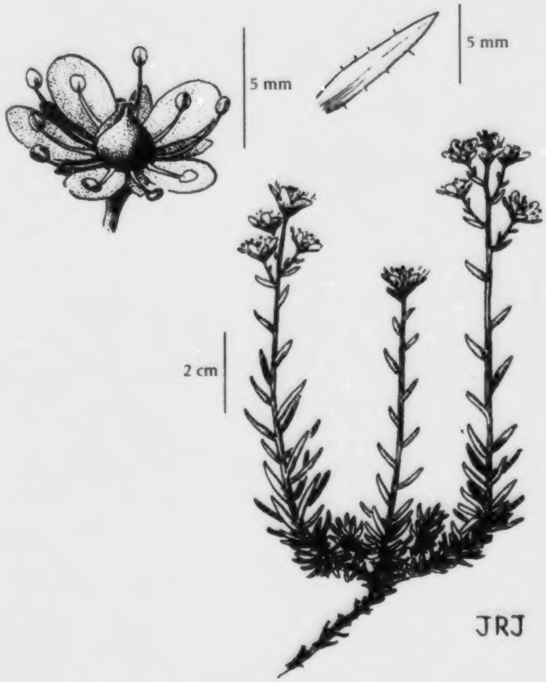
Leaves: Basal leaves narrowly oblong to linear, 5-15 mm long, 1 mm wide, fleshy, smooth or sparsely fringed, spine-tipped, unstalked; stem leaves alternate, similar to the basal, to 2 mm wide.

Flowers: Inflorescence a terminal, few-flowered cluster with several bracts; petals yellow, some with orange spots, linear-oblong, 4-6 mm long; calyces joined to ovary for about 1 mm, the free hypanthium absent, the calyx lobes 5, triangular egg-shaped, 3-4 mm long, spreading, greenish; stamens 10 (11-12).

Fruits: Capsules, 4-6 mm long; seeds wrinkled.



Saxifraga adscendens ssp. *oregonensis*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Saxifraga aizoides

Saxifraga bronchialis **L.** (Wieg.) Piper (*S. bronchialis* ssp. *vespertina* [Small] Piper = ssp. *austromontana; S. funstonii* (Small) Fedde = ssp. *funstonii*)

spotted saxifrage; prickly saxifrage (ssp. *austromontana*); **Funston's saxifrage** (ssp. *funstonii*)

HABITAT/RANGE:

Mesic to dry rock outcrops, gravelly ridges and fellfields and scree slopes in the montane and subalpine zones (ssp. *austromontana*) or alpine zone (ssp. *funstonii*); common throughout BC except absent on the Queen Charlotte Islands (ssp. *austromontana*); locally frequent in extreme NW BC (ssp. *funstonii*); ssp. *austromontana* – E to AB and S to NM, UT, ID and OR; ssp. *funstonii* – amphiberingian, N to AK, YT and W NT; E Asia.

DESCRIPTION:

General: Caespitose, perennial herb from branched stem-bases, forming densely matted flat cushions; stems numerous, the flowering stems 4-15 cm tall, glandular-hairy.

Leaves: Basal leaves crowded, partly overlapping, leathery, persistent for several years, linear-lanceolate to oblong or spoon-shaped, 5-15 mm long, 1-2.5 mm wide, usually entire, smooth except bristly-fringed, the tips with tooth-like point, unstalked; stem leaves alternate, smaller than the basal, glandular-fringed.

Flowers: Inflorescence of terminal, 2- to 10-flowered, somewhat flat-topped clusters; petals white to cream, yellow- or red-spotted, 4.5-8 mm long, clawed or narrowed without a noticeable claw, the blades oblong to almost oval; calyces saucer-shaped, joined to ovary for about 1/2 to 1/3 length of lobes, the free hypanthium absent, the calyx lobes 5, triangular to oval, 1.5-2.5 mm long, smooth or lightly fringed, spreading; stamens 10 (11-12).

Fruits: Capsules, 4-10 mm long, usually purplish; seeds dark brown, 0.7-0.9 mm long, nearly smooth.

Notes: Two subspecies are recognized in BC:

1. Petals clawed, mostly drying a deep yellow; petal spots yellow; plants of NW BC .... ssp. *funstonii* (Small) Hult.

1. Petals not clawed, mostly drying cream or pale yellow; petal spots red or crimson; common throughout BC except absent on the Queen Charlotte Islands .... ssp. *austromontana* (Wieg.) Piper

Saxifraga caespitosa **L.** ***sens. lat.*** (*S. caespitosa* var. *minima* Blank, *S. caespitosa* var. *emarginata* [Small] Rosend., *S. caespitosa* var. *subgemmifera* [Engl. & Irmsch.] C.L. Hitchc., *S. caespitosa* ssp. *monticola* [Small] Porsild, *S. caespitosa* ssp. *sileneflora* [Sternb. *ex* Chamisso] Hult.)

tufted saxifrage

HABITAT/RANGE:

Moist to dry, open gravelly areas, stream banks, cliffs, rocky slopes and ledges from the lowland to alpine zones; frequent throughout BC, except SC BC; circumpolar, N to AK and YT, E to NF and S to NM, AZ and CA; NE Eurasia.

DESCRIPTION:

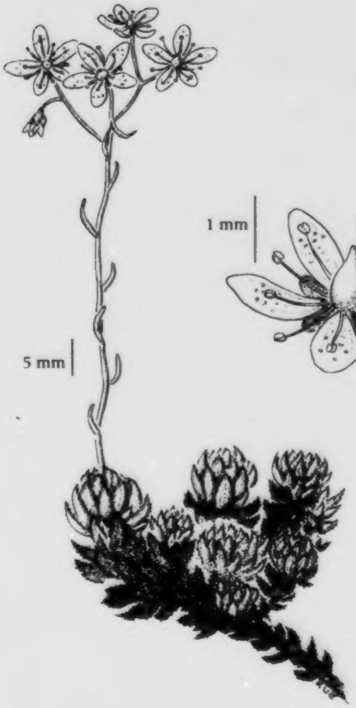
General: Caespitose, perennial herb from branched stem-bases, often forming mats; numerous leafy branches, the flowering stems 3-15 cm tall, glandular-hairy.

Leaves: Basal leaves usually 3-lobed, the lobes linear to lanceolate, narrowed to wide stalks, lightly glandular-fringed to soft-hairy, crowded on sterile shoots, 5-20 mm long; stem leaves 2 to 5, alternate, entire or lower ones lobed, reduced.

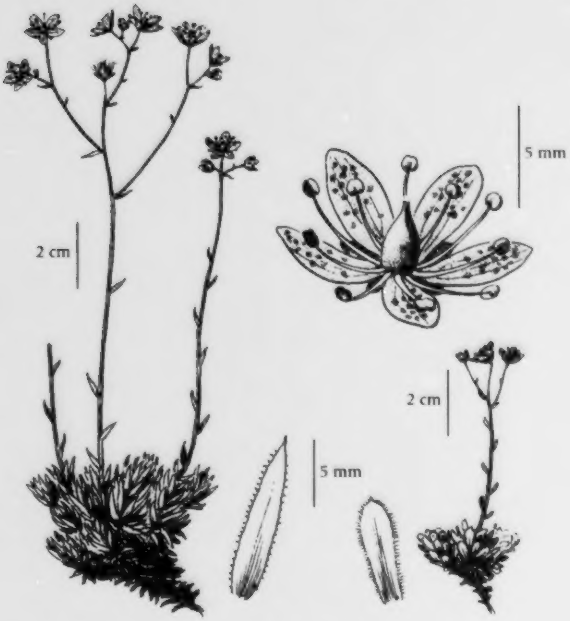
Flowers: Inflorescence of terminal, 2- to 10-flowered, somewhat flat-topped clusters; petals creamy white, deciduous, egg-shaped to broadly wedge-shaped, 3.5-5.5 mm long, narrowed to a broad base or claw, the tips rounded, sometimes notched; calyces broadly bell-shaped, joined to ovary for about the same to 1/2 length of lobes, the free hypanthium absent, the calyx lobes 5, egg-shaped to oblong, 1-3 mm long, purplish, glandular-hairy, spreading; stamens 10.

Fruits: Capsules, 5-10 mm long; seeds dark brown, egg-shaped, about 0.5 mm long, minutely pimpled.

Notes: A highly variable species complex in which many taxa have been described. Since there is no satisfactory treatment of even the North American representatives the recognition of the supposed taxa that occur in BC would serve little purpose here. For an alternative treatment see C.L. Hitchcock *et al.* (1961) or Scoggan (1978).



Saxifraga bronchialis ssp. *funstonii*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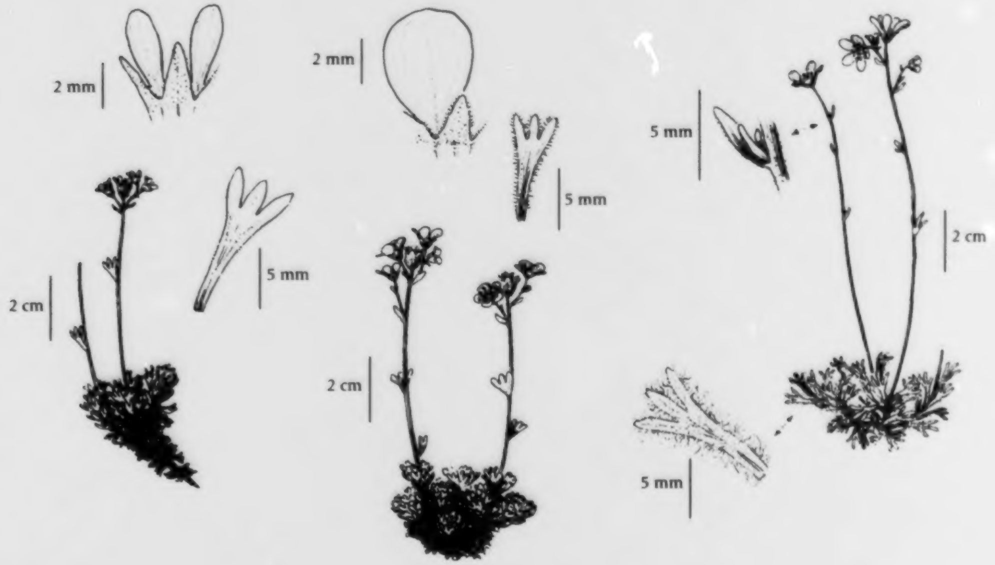
Saxifraga bronchialis ssp. *austromontana*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Saxifraga caespitosa

Saxifraga cernua L.
nodding saxifrage
HABITAT/RANGE:

Moist streambanks, screes slopes and ledges in the alpine zone; common in BC in and E of the Coast-Cascade Mountains, except absent in SC BC; circumpolar, N to AK, YT and NT, E to Labr. and PQ and S to NH, MN, SD, NM, UT, NV and WA; Iceland; N Eurasia.

DESCRIPTION:

General: Perennial herb from dense, fibrous roots; one or more simple flowering stems 10-25 cm tall, glandular-hairy.

Leaves: Basal leaves kidney-shaped, 10-25 mm wide, 5- to 7-lobed, long-stalked, the stalks slender, with purple bulblets in the axils; stem leaves several, alternate, lower ones similar to the basal leaves, upper ones reduced, bract-like, with purple bulblets in axils.

Flowers: Inflorescence a solitary, terminal flower or lacking, 1 or 2 of the lowermost flowers replaced by purplish bulblets; petals white, deciduous, egg-shaped to wedge egg-shaped, 5-12 mm long, the tips notched; calyces broadly bell-shaped, 3-4.5 mm long, dark green to purplish, joined to ovary for part of length, the free hypanthium absent, the calyx lobes 5, egg-shaped to lanceolate, 2.5- to 4-times length of joined portion of calyx, spreading; stamens 10.

Fruits: Capsules, rarely developing.

Saxifraga ferruginea R.C. Grah. (*S. newcombei* [Small] Engl. & Irmsch., *S. vreelandii* [Small] Irmsch.)
Alaska saxifrage
HABITAT/RANGE:

Moist rock outcrops, gravelly slopes and streambanks in the lowland to alpine zones; frequent throughout BC, except absent in NE BC; N to AK and YT, E to AB and S to WY, ID and CA.

DESCRIPTION:

General: Perennial herb from thick stem-bases and dense fibrous roots; flowering stems 1 or more, 15-35 cm tall, branched, soft-hairy below, glandular-hairy above.

Leaves: Basal leaves in a rosette, oblanceolate to wedge-shaped, 2-10 cm long, 5-15 mm wide, 7- to 17-toothed, gradually tapered at base to winged stalks, somewhat fleshy, greyish-hairy, thin-hairy or sparsely fringed; stem leaves lacking.

Flowers: Inflorescence open, diffuse, branched, the bracts leaf-like or greatly reduced and linear, the lower ones often with bulblets; petals white, curved to one side of flower, 4-6 mm long, of 2 types, 3 wider and egg-shaped with bases squared-off to heart-shaped, the other 2 more elliptic-lanceolate to broadly egg-shaped, the bases wedge-shaped; calyces nearly free of ovary, lobed almost to base, the lobes oblong-egg-shaped, 1.5-2.5 mm long, reddish or purplish, sharply bent back; stamens 10.

Fruits: Capsules, 4-6 mm long; seeds brownish, about 0.7 mm long, with several lengthwise rows of pimples.

Saxifraga flagellaris **Willd.** *ex* **Sternb. ssp.** *setigera* **(Pursh) Tolm.**
stoloniferous saxifrage
HABITAT/RANGE:

Dry to moist meadows, fellfields and ridges in the alpine zone, predominantly on limestone; infrequent in N BC south to 55° N, disjunct in the Itcha Range (Chilcotin area); amphiberingian, N to AK, YT and W NT and E to AB; NE Asia.

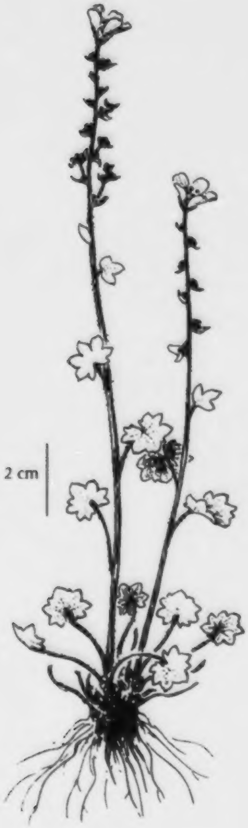
DESCRIPTION:

General: Perennial herb from dense fibrous roots; stems 3-15 cm tall, purplish-glandular-hairy; several to many threadlike, leafless stolons to 10 cm long, with small, rooting rosette at ends.

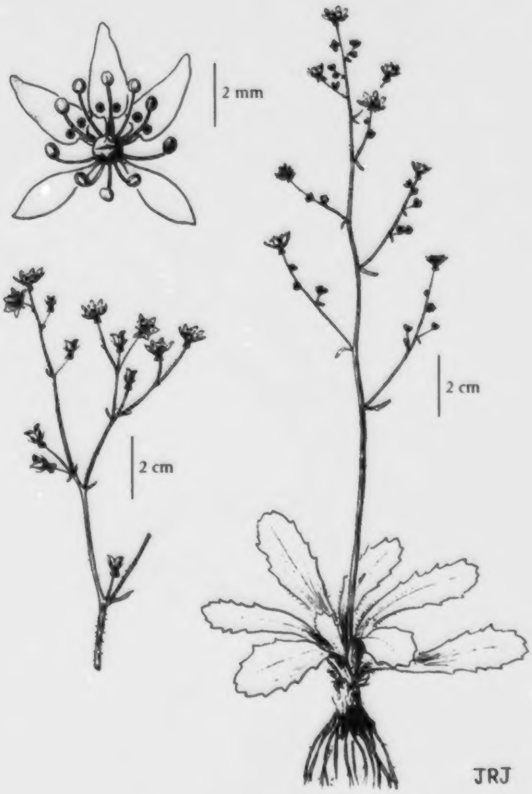
Leaves: Basal leaves in a rosette, oblanceolate to spoon-shaped, 0.5-2 cm long, 1-4 mm wide, entire, fringed with coarse, spiny hairs and a tooth-like point at tips; stem leaves numerous, alternate, reduced upwards.

Flowers: Inflorescence terminal, of 1 to 3 flowers; petals bright yellow, wedge-egg-shaped, 6-12 mm long, 5- to 9-veined, narrowed to a broad, claw-like base; calyces bell-shaped, 3-4.5 mm long, joined to ovary for part of length, the free hypanthium absent, the calyx lobes 5, triangular to oblong-lanceolate, 2.5-4.5 mm long, greenish, glandular-hairy, ascending; stamens 10.

Fruits: Capsules, 4-10 mm long; seeds brownish, about 0.6 mm long, nearly smooth.



Saxifraga cernua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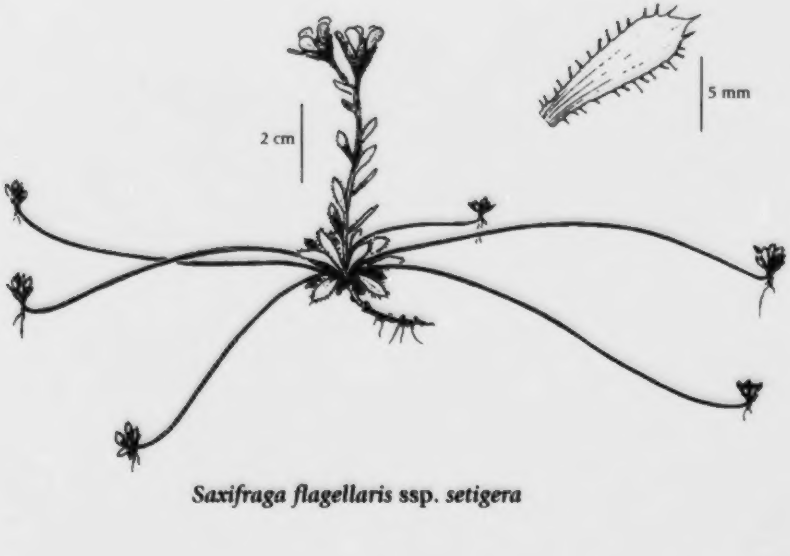
Saxifraga ferruginea



Saxifraga flagellaris ssp. *setigera*

Saxifraga hieraciifolia* Waldst. & Kit. var. *hieraciifolia

hawkweed-leaved saxifrage

HABITAT/RANGE:

Moist to wet meadows and solifluction slopes in the alpine zone; rare in extreme N BC (known only from Mt. Mansfield and Liard Plateau); circumpolar, N to AK, YT and NT; Greenland, N Eurasia.

DESCRIPTION:

General: Perennial herb from short, stout rhizomes; flowering stems 10-50 cm tall, thick, glandular-hairy, leafless.

Leaves: Basal leaves in a rosette, elliptic to oblanceolate, 2-12 cm long, 4-40 mm wide, 5- to 19-toothed to nearly entire, wedge-shaped at base, thick, glandular-fringed, short-stalked; stem leaves lacking.

Flowers: Inflorescence spike-like, the flowers in small dense clusters, subtended by small leaf-like bracts; petals reddish-purple, elliptic to lanceolate, 2-3 mm long; calyces lobed, the lobes egg-shaped to triangular, 1.5-3 mm long, green to reddish-purple, spreading; stamens 10.

Fruits: Capsules, 5-7 mm long, purplish-black.

Saxifraga hirculus* L. ssp. *hirculus

yellow marsh saxifrage

HABITAT/RANGE:

Wet meadows and bogs in the alpine zone; rare in N BC; circumpolar, N to AK, YT and NT, E to N PQ, disjunct in MT, CO and UT; Iceland, N Eurasia.

DESCRIPTION:

General: Perennial herb from a freely branched stem-base and fibrous roots; flowering stems erect, 5-25 cm tall, brownish- or yellowish-hairy, at least above.

Leaves: Basal leaves in a rosette, linear-oblanceolate to spoon-shaped, 1-4 cm long, 1-3 mm wide, smooth or nearly so; stem leaves 3 to 7, unstalked, smaller above.

Flowers: Inflorescence usually of a single, terminal flower, nodding at first; petals bright yellow, 7-15 mm long, 5- to 7-veined; calyx lobes egg-shaped to lanceolate, 3-5 mm long, greenish to reddish, often glandular-hairy, fringed, spreading; stamens 10.

Fruits: Capsules, 7-12 mm long.

***Saxifraga integrifolia* Hook.**

grassland saxifrage

HABITAT/RANGE:

Moist to dry grassy slopes, meadows and rock outcrops in the lowland and montane zones; frequent in SW BC south of 52° N; S to MT and CA.

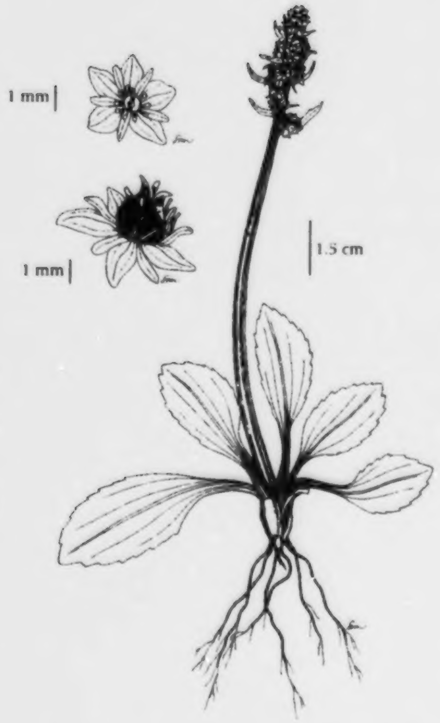
DESCRIPTION:

General: Perennial herb from thick stem-bases with short rhizomes, sometimes with bulblets; flowering stem 1, 10-30 cm tall, hairy to nearly smooth below, glandular-hairy above, the glands mostly reddish or purplish.

Leaves: Basal leaves egg-shaped, 2-7 cm long, 1-4 cm wide, gradually tapered at base, entire or minutely toothed, usually fringed, sometimes smooth, but often with rusty, tangled hairs below; stalks 5-40 mm long; stem leaves lacking.

Flowers: Inflorescence a terminal cluster of flowers, conical and open-branched, the bracts usually linear to linear-lanceolate, some with rusty, woolly hairs; petals usually whitish or yellowish, 2-4 mm long, egg-shaped, narrowed to a slightly clawed base, deciduous; calyces cone-shaped, joined to the base of the ovary, free hypanthium absent, the lobes egg-shaped, 1-2 mm long, spreading, sometimes bent back; stamens 10.

Fruits: Follicles, 3.5-5 mm long, often reddish or purplish; seeds brown, about 0.6 mm long, lightly wrinkled lengthwise.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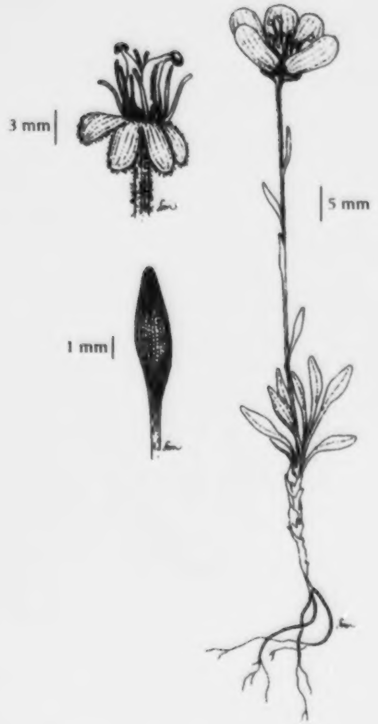
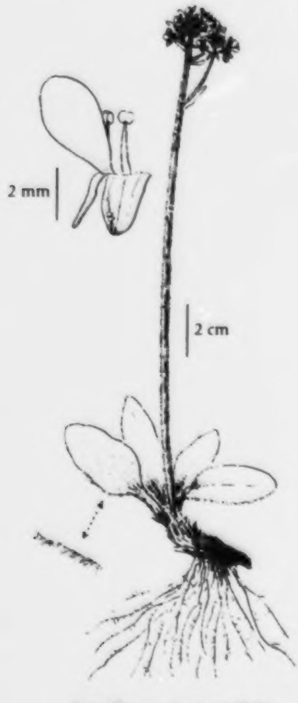
Saxifraga hieraciifolia var. *hieraciifolia*



Saxifraga hirculus ssp. *hirculus*



Saxifraga integrifolia

***Saxifraga lyallii* Engl.**

red-stemmed saxifrage; Lyall's saxifrage

HABITAT/RANGE:

Moist to wet streambanks, seepage sites, meadows and gravelly slopes in the montane to alpine zones; frequent throughout all but extreme NE BC; var. *hulteni* – amphiberingian, N to AK, YT and SW YT, E Asia, var. *lyallii* – E to AB and S to MT, ID and WA.

DESCRIPTION:

General: Perennial herb from well-developed rhizomes, often matted; flowering stems 4-30 cm tall.

Leaves: Basal leaves spoon-shaped or fan- to egg-shaped, 1-8 cm long, 0.3-5 cm wide, 7- to 17-toothed, the teeth 2-4 mm long, gradually tapered at base to slender stalks about length of blades, smooth, or sparsely brown soft-hairy above; stem leaves lacking or single, small and bract-like.

Flowers: Inflorescence open, of up to 15 flowers, the flower stalks slender and usually bracted, the bracts linear, entire, the inflorescence, calyces and fruits often bright red; petals white, often aging pinkish, egg-shaped, 2.5-5 mm long, claw less than 0.5 mm long, deciduous; calyces lobed almost to base, free hypanthium absent, the lobes oblong-lanceolate, 2-4 mm long, sharply bent back; stamens 10.

Fruits: Follicles, body 6-12 mm long, beaks slender, curved outward; seeds brownish, about 0.7 mm long, with several lengthwise rows of thick, scale-like pimples.

Notes: Hybridizes extensively with *S. odontoloma* in S BC. Two varieties occur in BC:

1. Plants 4-14 cm high; leaves spoon-shaped; plants of extreme SE and SW BC .... var. *lyallii*

1. Plants 9-30 cm high; leaves fan- or egg-shaped; the widely distributed variety in BC .... var. *hulténii* Calder & Savile

***Saxifraga mertensiana* Bong.**

wood saxifrage; Merten's saxifrage

HABITAT/RANGE:

Moist streambanks, ledges and rock outcrops from the lowland and steppe to subalpine zones; frequent in BC south of 55° N, rare in NW BC (Haines Triangle); N to S AK, E to AB and S to MT, ID and CA.

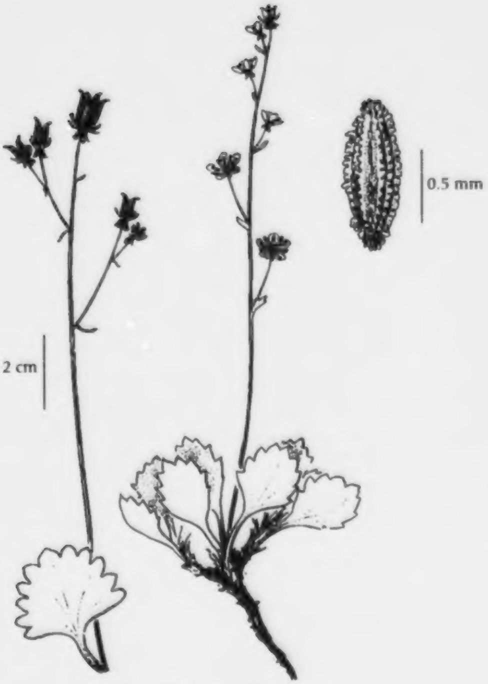
DESCRIPTION:

General: Perennial herb from short, thick rhizomes, with bulblets; flowering stems 15-40 cm tall, commonly long- and glandular-hairy.

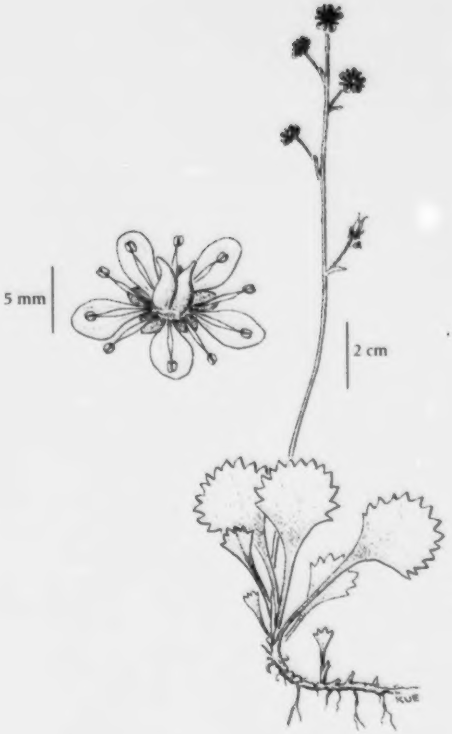
Leaves: Basal leaves 1 to 3, round-to kidney-shaped, heart-shaped at base, somewhat fleshy and brittle, 3-10 cm wide, 13- to 17-lobed, the main lobes 3- to 5-toothed, usually sparsely hairy, at least below; stalks long, up to 4-times blade length, often with bulblets in axils; stem leaves lacking.

Flowers: Inflorescence open, many-flowered, some flowers replaced by pinkish bulblets; petals white, oblong-elliptic to egg-shaped, 3-5 mm long; calyces lobed almost to base, free hypanthium absent, the lobes lanceolate to lance-oblong, shorter than petals, sharply bent back, sparsely glandular-hairy; stamens 10.

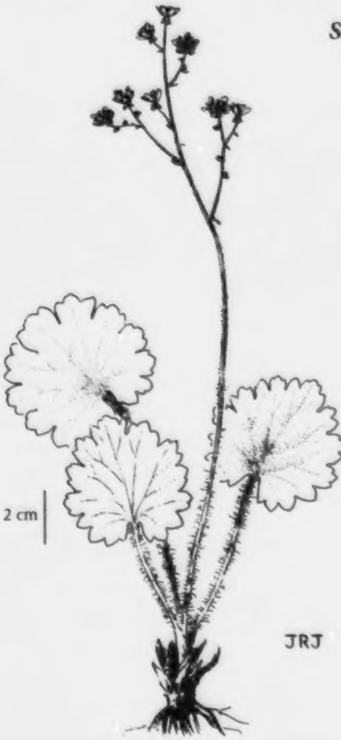
Fruits: Capsules, 4-6 mm long; seeds light brown, about 1 mm long, lightly wrinkled.



Saxifraga lyallii var. *lyallii*



Saxifraga lyallii var. *hulténii*



Saxifraga mertensiana

Saxifraga nelsoniana **D. Don** (*S. punctata* ssp. *carlottae* Calder & Savile = ssp. *carlottae*; *S. punctata* ssp. *cascadensis* Calder & Savile = ssp. *cascadensis*, Hult.; *S. punctata* ssp. *pacifica* Hult. = ssp. *pacifica*; *S. porsildiana* [Calder & Savile] Jurtzev & Petrovsky, *S. punctata* ssp. *porsildiana* Calder & Savile = ssp. *porsildiana*)

dotted saxifrage

HABITAT/RANGE:

Moist rock outcrops, scree, meadows and streambanks from the montane to alpine zones; common throughout BC; ssp. *carlottae* – N to SE AK; ssp. *cascadensis* – S to OR; ssp. *pacifica* – amphiberingian, N to AK, YT and NT; NE Asia; ssp. *porsildiana* – amphiberingian, N to AK, YT and NT and E to AB; NE Asia.

DESCRIPTION:

General: Perennial herb from branched stem-bases with rhizomes; flowering stems 10-30 cm tall, mostly smooth below, long-hairy above.

Leaves: All basal, kidney-shaped, 1.0-7.7 cm wide, 1/2 to 4/5 as long, coarsely 7- to 21-toothed, the teeth up to 1 cm long, the leaves smooth, sparsely or stiff-hairy near the base, sometimes fringed, the stalks long, 1- to 5-times blade length.

Flowers: Inflorescence a many-flowered, terminal, congested or open panicle with appressed or ascending hairs, the lowest branch often from leaf-like bracts; petals white to pink, 2.5-4 mm long, oblong, the tips rounded to notched, slightly clawed, deciduous; calyces lobed nearly to base, slightly joined to the base of the ovary, free hypanthium absent, the lobes egg-shaped to narrowly egg-shaped, 1-2 mm long, green to purplish, fringed, bent back; stamens 10.

Fruits: Capsules; 3-12 mm long, purplish, tips spreading to bent; seeds brown, about 0.8 mm long, ridged lengthwise with pimples.

Notes: Four intergrading subspecies occur in BC.

1. Largest leaves mostly with 9 to12 teeth; capsules 6-12 mm long; plants of the Queen Charlotte Islands, adjacent mainland and Coast Mountains of NW BC .... ssp. *carlottae* (Calder & Savile) Hult.

1. Largest leaves mostly with 12 to 18 teeth; capsules 3-8 mm long; plants of mainland BC.

  2. Panicles open, the hairs appressed; plants slender; plants of SW BC .... ssp. *cascadensis* (Calder & Savile) Hult.

  2. Panicles often congested, the hairs ascending; plants robust; plants of N BC and the Rocky Mountains.

    3. Largest leaves 2.3-7.7 cm wide, slightly fringed and stiff-hairy near the leaf stalks; capsule cleft 25-60%; plants of NW BC .... ssp. *pacifica* (Hult.) Hult.

    3. Largest leaves 1.0-3.8 cm wide, smooth or sparsely hairy; capsule cleft 40-75%; plants of N BC north of 56° N .... ssp. *porsildiana* (Calder & Savile) Hult.

Saxifraga nidifica **(Greene) Small var. *nidifica*** (*S. integrifolia* Hook. var. *leptopetala* [Suksd.] Engl. & Irmsch., *S. integrifolia* Hook. var. *columbiana* [Piper] C.L. Hitchc.)

meadow saxifrage

HABITAT/RANGE:

Dry open forests, gravelly slopes, grasslands, shrublands and meadows in the steppe and montane zones; locally frequent in SC and SE BC east of the Cascade Mountains and S of 51° N; S to WY, UT, NV and CA.

DESCRIPTION:

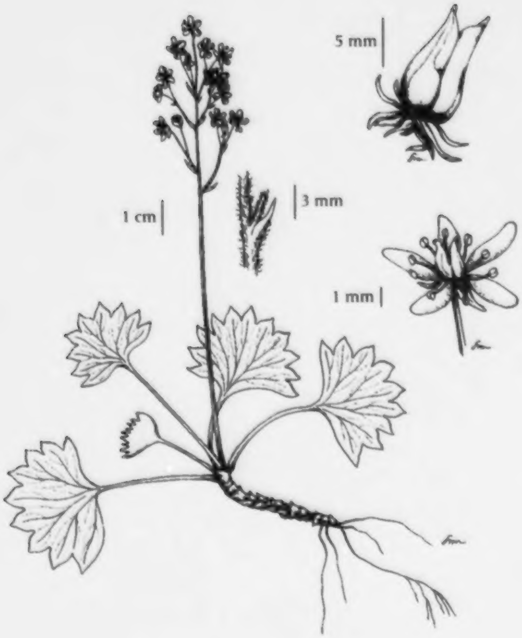
General: Perennial herb from thick stem-bases with short rhizomes, sometimes with bulblets; flowering stem 1, 10-30 cm tall, hairy to nearly smooth below, glandular-hairy above, the glands mostly reddish or purplish.

Leaves: Basal leaves egg-shaped to triangular, 2-7 cm long, 1-4 cm wide, gradually tapered at base, entire or minutely toothed, usually fringed, sometimes smooth, but often with rusty, tangled hairs below, the stalks 15-50 mm long; stem leaves lacking.

Flowers: Inflorescence a terminal cluster of flowers, compact, cylindric, the bracts usually linear to linear-lanceolate, some with rusty, woolly hairs; petals usually whitish or yellowish, 1-2 mm long, narrowly elliptic to round; calyces cone-shaped, joined to the base of the ovary, free hypanthium absent, the lobes egg-shaped to triangular, as long as or longer than petals, spreading, sometimes bent back; stamens 10.

Fruits: Follicles, 3.5-5 mm long, often reddish or purplish; seeds brown, about 0.6 mm long, lightly wrinkled lengthwise.

Notes: Some material east of the Cascade Mountains appears to approach var. *claytoniaefolia* (Canby *ex* Small) Elvander in some aspects but these plants are not sufficiently distinct from var. *nidifica*.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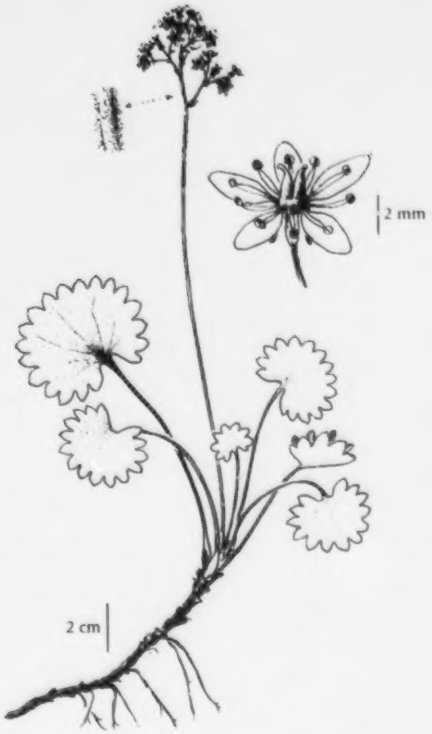
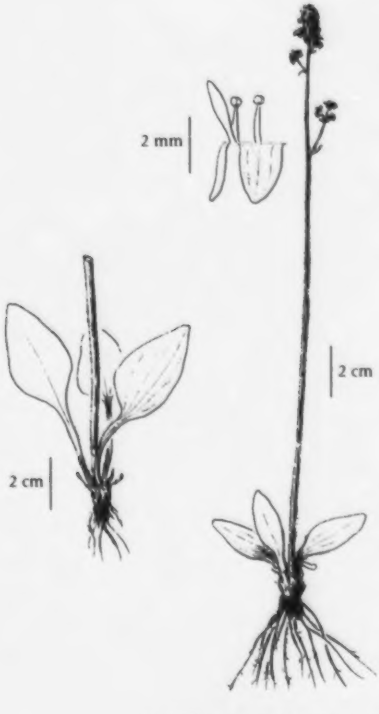
Saxifraga nelsoniana ssp. *carlottae*



Saxifraga nelsoniana ssp. *cascadensis*



Saxifraga nidifica var. *nidifica*

***Saxifraga nivalis* L.** (*S. nivalis* var. *tenuis* Wahl., *S. tenuis* [Wahl.] H. Sm.)

alpine saxifrage

HABITAT/RANGE:

Moist rock outcrops and meadows in the alpine zone; frequent in N BC, rare in SW BC; circumpolar, N to AK, YT and NT and E to PQ; Eurasia.

DESCRIPTION:

General: Perennial herb from short, stout rhizomes, and black, fibrous roots; flowering stems 5-20 cm tall, glandular-hairy.

Leaves: Basal leaves in a rosette, leathery, oblanceolate to spoon- or egg-shaped, 1.2-4.5 cm long, 4-16 mm wide, 9- to 21-toothed, gradually tapered at base, sparsely soft-hairy to smooth, sometimes rusty-hairy, fringed; stem leaves lacking.

Flowers: Inflorescence of 1 to 3 dense clusters of flowers; petals white to pink, 2-3 mm long, egg-shaped to lanceolate, slightly clawed; calyx lobes green to purplish, egg-shaped to triangular, 1-3 mm long, erect; stamens 10.

Fruits: Capsules, 5-7 mm long.

Notes: Plants with rust-coloured hairs on the leaf stalks and underside of the leaves have been recognized as var. *tenuis* Wahl. They are generally of somewhat smaller stature and more delicate than typical *S. nivalis*. The distribution of var. *tenuis* in BC remains to be established.

***Saxifraga occidentalis* S. Wats.** (*S. occidentalis* var. *allenii* [Small] C.L. Hitchc.)

western saxifrage

HABITAT/RANGE:

Moist to dry meadows and gravelly slopes from the montane to alpine zones; common throughout most of BC to 59° N, absent from NE BC and the coastal islands; E to AB and S to SD, NM, ID, NV and CA.

DESCRIPTION:

General: Perennial herb from short, horizontal rhizomes; flowering stem 1, 10-25 cm tall, glandular-hairy, usually with red glands.

Leaves: Basal leaves egg-shaped to diamond-shaped, 3-8 cm long, 1-3 cm wide, coarsely and irregularly toothed with 15 to 30 teeth, wedge-shaped at base, fringed, sparsely long-hairy, only young leaves reddish woolly-hairy below; stalks slender to slightly winged; stem leaves lacking.

Flowers: Inflorescence terminal, open to compact, of several clusters of flowers; petals white to pink, 1.5-3.5 mm long, egg-shaped to oblong, narrowed to a distinct or indistinct claw, deciduous; calyces joined to the lower portion of the ovary, free hypanthium present or absent, the lobes green to purplish, egg-shaped to oblong lanceolate, 1-2.5 mm long, spreading or bent back; stamens 10.

Fruits: Follicles, 3-6 mm long, greenish to reddish-purple; seeds brownish, about 0.7 mm long, wrinkled lengthwise.

***Saxifraga odontoloma* Piper** (*S. arguta auct. non* D. Don)

stream saxifrage

HABITAT/RANGE:

Wet streambanks and moist shady places in the montane and subalpine zones; frequent in SW BC, rare northward; E to AB and S to NM, AZ and CA.

DESCRIPTION:

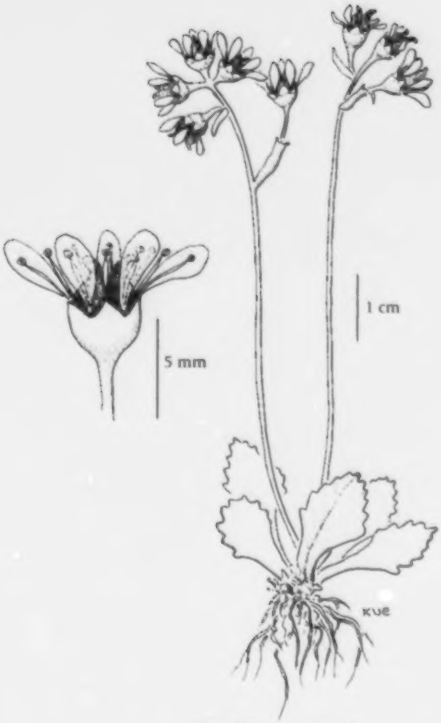
General: Perennial herb from well-developed rhizomes, often matted; flowering stems 20-60 cm tall, smooth below, glandular-hairy above, with red or purplish glands.

Leaves: Basal leaves round with kidney-shaped base, 2-8 cm wide, about 3/4 as long, 15- to 29-toothed, the teeth coarse, sharp, up to 7 mm long, fringed; stalks several times longer than blades, with stipular bases; stem leaves lacking.

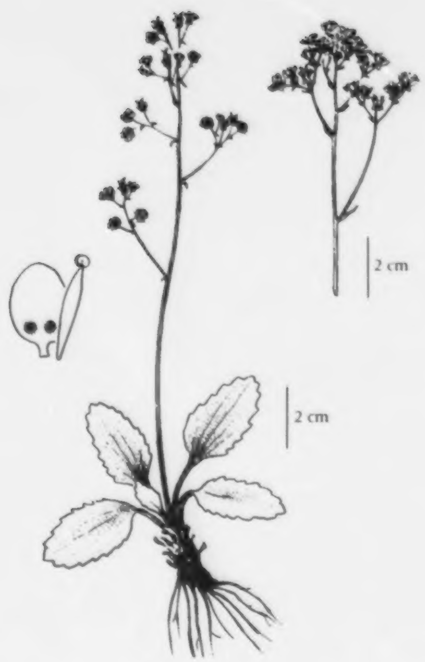
Flowers: Inflorescence open, spreading; petals white, 2-spotted, round to elliptic, 3-4 mm long, abruptly narrowed at base, deciduous; calyces lobed almost to base, free hypanthium absent, the lobes oblong-lanceolate to oblong-egg-shaped, 1.5-2 mm long, bent back, often pinkish or purplish; stamens 10.

Fruits: Capsules, 6-10 mm long, usually purplish; seeds brown, about 1 mm long, with several lengthwise rows of thick, scale-like pimples.

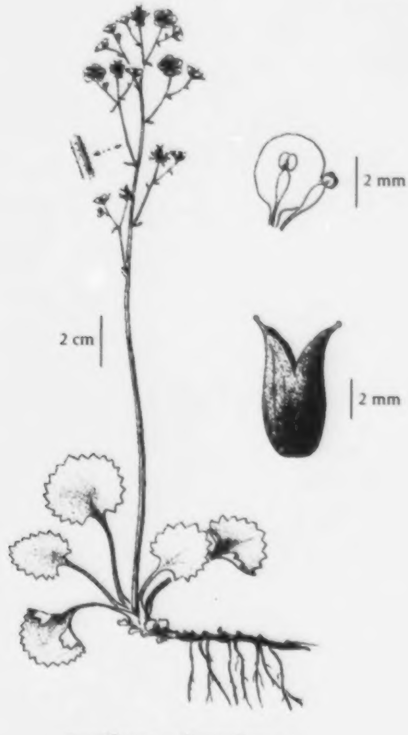
Notes: Hybridizes extensively with *S. lyallii* in S BC.



Saxifraga nivalis



Saxifraga occidentalis



Saxifraga odontoloma

Saxifraga oppositifolia **L.** (*S. oppositifolia* ssp. *smalliana* [Engl. & Irmsh.] Hult.)

purple mountain saxifrage

HABITAT/RANGE:

Moist to mesic meadows fellfields, slopes and rock outcrops in the upper subalpine and alpine zones; frequent throughout BC; circumpolar, N to AK, YT and NT, E to NF and S to NH, VT, WY, ID and OR; Iceland; N Eurasia.

DESCRIPTION:

General: Caespitose, perennial herb forming thick cushions to 20 cm across and 2-7 cm tall; flowering stems 1-5 cm tall; plants generally smooth but bristle-fringed on leaves and calyces.

Leaves: Basal leaves lacking, stem leaves opposite, persistent, oblong- to egg-shaped, 1-5 mm long, fringed, unstalked, overlapping on non-flowering shoots.

Flowers: Inflorescence of single flowers, at ends of leafy branches; petals bright pink-purple to blue-purple, or rarely white, spoon-egg-shaped to egg-shaped-oblong, 6-9 mm long, 5- to 7-veined; calyces cup-shaped, lobed for 3/4 or more of length, free hypanthium absent, the lobes oblong-oval, 2-3.5 mm long, fleshy, coarsely fringed, erect or slightly spreading; stamens 10.

Fruits: Capsules, 6-9 mm long; seeds light brown, about 0.6 mm long, lightly veined.

Saxifraga razshivinii **Zhmylew** (*Saxifraga davurica* Willd. ssp. *grandipetala* [Engl. & Irmsch.] Hult.)

Razshivin's saxifrage

HABITAT/RANGE:

Moist to wet solifluction slopes, scree slopes and seepage sites in the alpine zone; rare in NW BC, known only from Squaw Creek, Haines Triangle; amphiberingian, N to AK, YT and NT; NE Asia.

DESCRIPTION:

General: Perennial herb from erect to ascending rhizomes; flowering stems 3-15 cm tall, smooth to nearly smooth, usually purple.

Leaves: Basal leaves spoon- to wedge-shaped or nearly oblanceolate, 2-5 cm long, 5-13 mm wide, 5- to 11- toothed at tip, fringed, smooth, gradually tapered to slender stalks; stem leaves single, small or lacking.

Flowers: Inflorescence of terminal, few-flowered clusters; petals usually purplish, sometimes white, egg-shaped-oblong to elliptic, 3-4 mm long; calyces purple or greenish-purple, the lobes 5, egg-shaped to triangular, slightly shorter than petals, smooth to slightly fringed, bent back; stamens 10.

Fruits: Capsules, 6-10 mm long, purplish black.

Saxifraga reflexa **Hook.**

Yukon saxifrage

HABITAT/RANGE:

Dry to mesic meadows, cliffs, gravelly slopes and fellfields in the alpine zone; infrequent in N BC; N to AK, YT and NT.

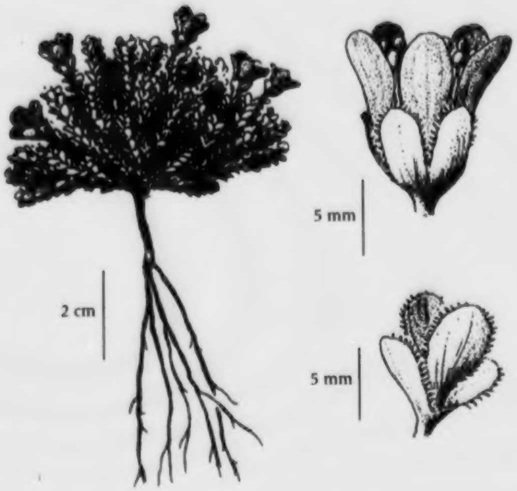
DESCRIPTION:

General: Perennial herb from short stem-bases and black fibrous roots; flowering stems 9-30 cm tall, glandular-hairy.

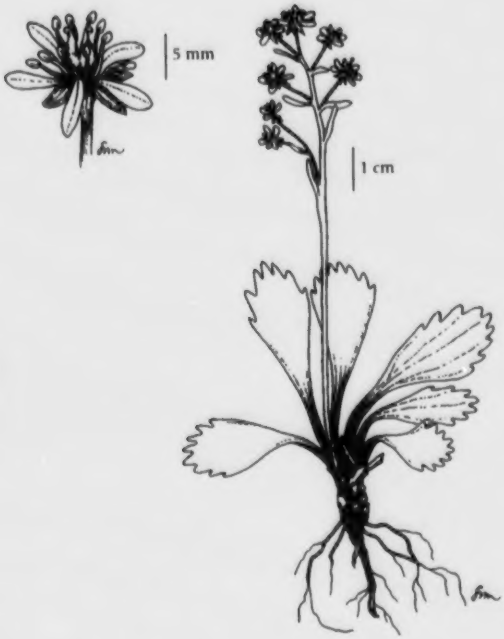
Leaves: Basal leaves round, oblanceolate or egg- to spoon-shaped, 2-8.5 cm long, 8-25 mm wide, 9- to 21- toothed, sparsely soft-hairy, often purplish below; stalks wide; stem leaves lacking.

Flowers: Inflorescence a terminal, many-flowered, open cluster, the bracts linear, purple; petals white, 2-3 mm long, distinctly 1-veined; calyces green, sometimes purplish, the lobes 5, egg-shaped to lanceolate, 1.2-3 mm long, minutely fringed, bent back; stamens 10.

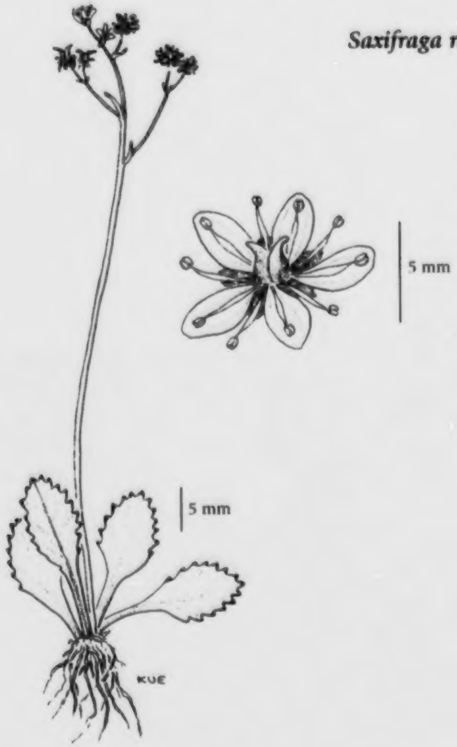
Fruits: Follicles, 3-6 mm long, usually purplish.



Saxifraga oppositifolia



Saxifraga razshivinii



Saxifraga reflexa

Saxifraga rivularis **L.** (*S. debilis* Engelm. *ex* A. Gray, *S. hyperborea* R.Br., *S. rivularis* var. *flexuosa* [Sternb.] Engl. & Irmsch.)

brook saxifrage

HABITAT/RANGE:

Moist to wet rock outcrops, gravelly slopes, streambanks and talus slopes in the subalpine and alpine zones; frequent throughout BC except absent from the Queen Charlotte Islands; circumpolar, N to AK, YT and NT, E to NF and S to NH, NM, AZ and CA; Iceland, N Eurasia.

DESCRIPTION:

General: Perennial herb from fibrous roots; stems 2-12 cm tall, soft- to woolly-hairy.

Leaves: Basal leaves round- to kidney-shaped, 0.3-1.2 cm long, 0.4-2.3 cm wide, 3- to 9-lobed, smooth, stalked, often with bulblets in the axils; stem leaves 1 or a few, alternate, fewer-lobed, without bulblets, short-stalked or unstalked.

Flowers: Inflorescence of 1 to few flowers, without bulblets; petals white to pink, 3-5 mm long, 1- to 3-veined; calyces green to reddish-purple, the lobes 5, egg-shaped to lanceolate or lance-oblong, 1-4.5 mm long, sparsely glandular-hairy; stamens 10.

Fruits: Capsules, 4-9 mm long; seeds brown, about 0.5 mm long, minutely wrinkled.

Saxifraga rufidula **(Small) Macoun** (*S. occidentalis* S. Wats. var. *rufidula* [Small] C.L. Hitchc., *S. aequidentata* [Small] Rosend., *S. tischii* Skelly)

rusty-haired saxifrage

HABITAT/RANGE:

Moist to dry rock outcrops in the lowland to alpine zones; frequent on Vancouver Island and the Gulf Islands, rare on the adjacent mainland; S to WA, OR and CA.

DESCRIPTION:

General: Perennial herb from stem-bases with short rhizomes or bulblets; flowering stem 1, 10-20 cm tall, glandular-hairy.

Leaves: All basal, egg-shaped to occasionally diamond-shaped, 4-10 cm long, 1-3 cm wide, coarsely and regularly toothed with 15 to 30 teeth, wedge-shaped to blunt at base, fringed, usually densely rusty-woolly below, stalks 4-8 cm long.

Flowers: Inflorescence terminal, usually open, of several clusters of flowers, flat-topped; petals white, pink or green, 1.5-3.5 mm long, egg-shaped, clawed, deciduous; calyces joined to the lower portion of the ovary, free hypanthium present, the lobes egg-shaped, 1-2.5 mm long, spreading, reddish-hairy; stamens 10.

Fruits: Follicles, 3-6 mm long, greenish to reddish-purple; seeds brownish, about 0.7 mm long, wrinkled lengthwise.

Saxifraga serpyllifolia **Pursh**

thyme-leaved saxifrage

HABITAT/RANGE:

Moist scree and gravel slopes in the alpine zone; rare in extreme NW BC; amphiberingian, N to AK, YT and NT; NE Asia.

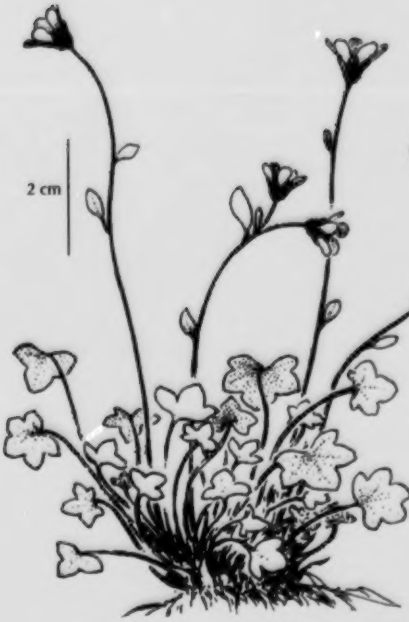
DESCRIPTION:

General: Perennial herb from long, somewhat rhizomatous, branched stem-bases, matted; flowering stems 2-8 cm tall, stalked-glandular.

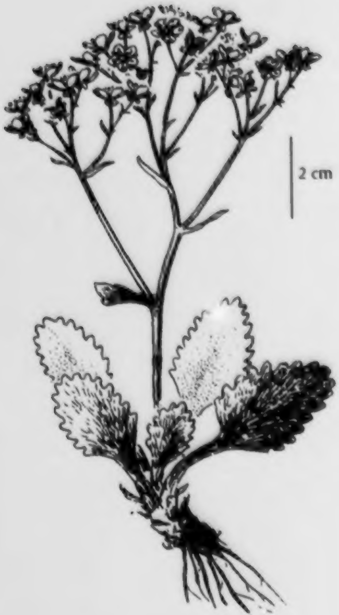
Leaves: Basal leaves few, much reduced; stem leaves numerous below, alternate, overlapping, linear-oblanceolate to spoon-shaped, 3-10 mm long, 1-2 mm wide, entire, smooth, shiny, fleshy.

Flowers: Inflorescence of solitary, terminal flowers; petals bright yellow, 4-7 mm long, 5- (7-) veined; calyces green to reddish, the calyx lobes 5, oblong to lanceolate, 1.5-3 mm long, smooth, spreading to bent back; stamens 10.

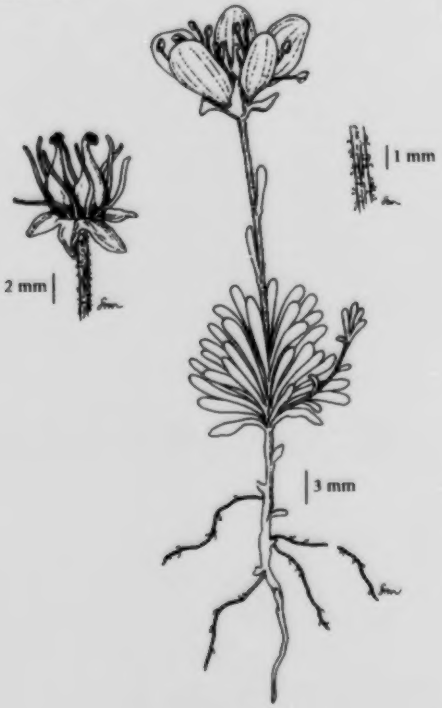
Fruits: Capsules, 5-7 mm long.



Saxifraga rivularis



Saxifraga rufidula



Saxifraga serpyllifolia

***Saxifraga taylori* Calder & Savile**

Taylor's saxifrage

HABITAT/RANGE:

Moist rock outcrops, talus slopes and cliffs in the subalpine and alpine zones; frequent in the Queen Charlotte Islands, rare on NW Vancouver Island; endemic.

DESCRIPTION:

General: Caespitose, perennial herb from taproots and stolons, often forming mats; numerous leafy branches, the flowering stems 12-16 cm tall, smooth.

Leaves: Basal leaves with 3 tooth-like lobes at apex, the lobes lanceolate to oblong, unstalked, fringed with bristle-like nonglandular hairs, crowded on sterile shoots, 8-12 mm long, persistent; stem leaves 2 to 5, alternate, entire or lower ones lobed, much reduced.

Flowers: Inflorescence of open, terminal, 1- to 3-flowered clusters; petals creamy white, egg-shaped, unspotted, 5-6.5 mm long, tips rounded; calyces bowl-shaped, joined to ovary for about 1/4 to 1/2 length of lobes, the free hypanthium absent, the lobes 5, egg-shaped to oblong, 3-5 mm long, purplish, smooth, spreading; stamens 10.

Fruits: Capsules, 4-6 mm long; seeds brown, egg-shaped, about 0.5 mm long, pimpled.

***Saxifraga tolmiei* T. & G.**

Tolmie's saxifrage

HABITAT/RANGE:

Moist rock outcrops, streambanks, snowbed sites and scree slopes in the upper subalpine and alpine zones; frequent in the Coast-Cascade Mountains N to 57° N and Vancouver Island, rare on the Queen Charlotte Islands and in E BC; N to SE AK and S toMT, ID, NV and CA.

DESCRIPTION:

General: Perennial herb from slender, woody stem-bases; flowering stems 3-8 cm tall, smooth or purplish glandular-hairy, leafless or with 1 to 3 leaves, many sterile leafy branches.

Leaves: Basal leaves few, if any; stem leaves numerous below, alternate, usually crowded, persistent for years, pear- to spoon-shaped or oblanceolate, 3-10 mm long, entire, fleshy, smooth or bases fringed.

Flowers: Inflorescence of terminal, single flowers or clusters of up to 4, lower branches often with leaf-like bractlets; petals white, 2.5-5 mm long, elliptic egg-shaped to broadly oblanceolate, clawed or not; calyces saucer-shaped, joined to the lower portion of the ovary, free hypanthium absent, smooth, purple-tinged, the lobes oval to oblong egg-shaped, 2-3 mm long, spreading; stamens 10.

Fruits: Capsules, 8-12 mm long, often purplish-mottled; seeds light brown, about 0.8 mm long.

***Saxifraga tricuspidata* Rottb.**

three-toothed saxifrage

HABITAT/RANGE:

Dry meadows, gravelly slopes, talus slopes, cliffs and ridges from the montane to alpine zones; common in BC and E of the Coast-Cascade Mountains and N of 52° N; N to AK, YT and NT, E to Labr. and PQ and S to MI; Greenland.

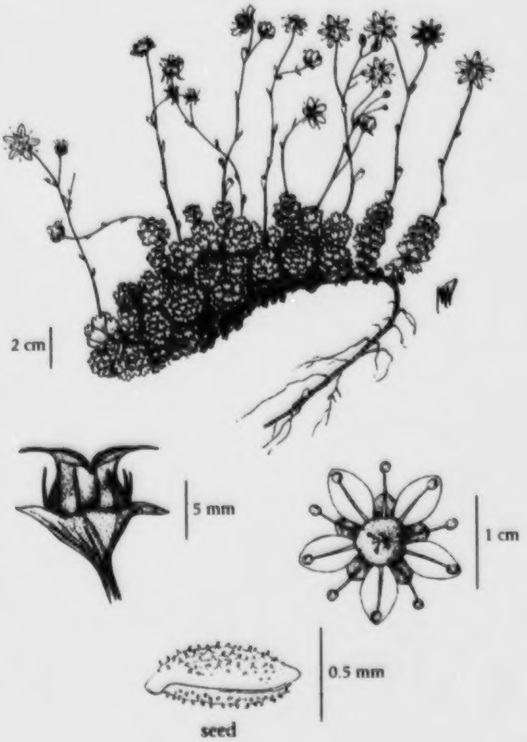
DESCRIPTION:

General: Caespitose, perennial herb from branched stem-bases, forming densely matted flat cushions; stems numerous, the flowering stems 3-25 cm tall, minutely glandular-hairy to smooth, with a few leaves.

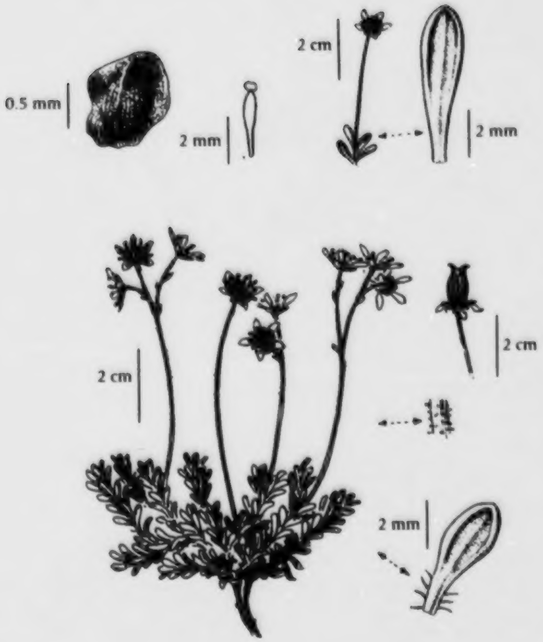
Leaves: Basal leaves crowded, partly overlapping, persistent for several years, oblong or spoon-shaped, 0.5-2 cm long, 1-7 mm wide, leathery, fringed, the tips 3-toothed, the teeth spine-tipped; stem leaves alternate, similar, becoming entire above.

Flowers: Inflorescence of few- to several-flowered, terminal, somewhat flat-topped clusters; petals white or pale yellow, usually orange-spotted in upper part, elliptic-oblong, 4-7 mm long; calyces saucer-shaped, joined to ovary for part of length, the calyx lobes egg-shaped to lanceolate, 1.5-3 mm long, glandular-fringed; stamens 10.

Fruits: Capsules, 4-8 mm long.


2 cm
5 mm
1 cm
0.5 mm
seed

Saxifraga taylori


0.5 mm
2 mm
2 cm
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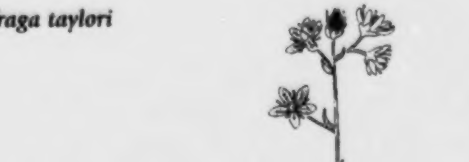
Saxifraga tolmiei



Saxifraga tricuspidata

***Saxifraga tridactylites* L.**

rue-leaved saxifrage

HABITAT/RANGE:

Dry rock outcrops and walls; rare in SW BC, known only from Fort Rodd Hill (Victoria); introduced from Europe.

DESCRIPTION:

General: Annual herb from a fibrous root; flowering stems erect, 2-16 cm tall, simple or branched; glandular-hairy.

Leaves: Basal leaves crowded, spoon-shaped, blades to 1 cm long, palmately 3- to 5-lobed, smaller leaves often entire; stem leaves similar, smaller.

Flowers: Inflorescence terminal, flowers single or few to several; petals white, egg- to wedge-shaped, 2-3 mm long; calyces reddish, bell-shaped, joined to ovary for much of length, glandular; the calyx lobes egg-shaped, erect; stamens 10.

Fruits: Capsules.

SUKSDORFIA

1. Petals 2.5-4 mm long, white, spreading; calyces broadly bell-shaped; discs present .... *S. ranunculifolia*

1. Petals 6-9 mm long, violet (rarely white), erect; calyces top-shaped; discs absent .... *S. violacea*

***Suksdorfia ranunculifolia* (Hook.) Engl.**

buttercup-leaved suksdorfia

HABITAT/RANGE:

Moist mossy, rock outcrops and ledges in the montane and subalpine zones; infrequent in S BC, rare in coastal BC, absent on the Queen Charlotte Islands; E to AB and S to MT, ID and N CA.

DESCRIPTION:

General: Perennial herb from scaleless stem-bases with many bulblets; stems 10-35 cm tall, smooth to lightly hairy below, glandular-hairy above, the glands yellow.

Leaves: Basal leaves several, heart- to kidney-shaped, 1-4 cm wide, deeply 3-lobed, toothed, the teeth coarse and rounded, nearly smooth, somewhat fleshy, the stalks stout, 3-11 cm long; stem leaves similar or reduced and narrower, 4 to 9, alternate, the stalks reduced; stipules of stem leaves enlarged, particularly upwards.

Flowers: Inflorescence a many-flowered terminal cluster, somewhat flat-topped; petals white or purplish-tinged at base, 2-4 mm long, egg-shaped to oblanceolate, spreading, entire, not clawed, persistent; calyces top-shaped, joined partly to ovary, the lobes triangular-lanceolate, 1-3 mm long, spreading, the tips slightly bent back; stamens 5, opposite the calyx lobes.

Fruits: Capsules, about 4 mm long; seeds brown, about 0.6 mm long, warty.

***Suksdorfia violacea* A. Gray**

violet suksdorfia

HABITAT/RANGE:

Moist rocky ledges, crevices and shady sandy places in the montane and subalpine zones; infrequent in SC and SE BC south of 52° N; E to AB and S to NW MT, ID and OR.

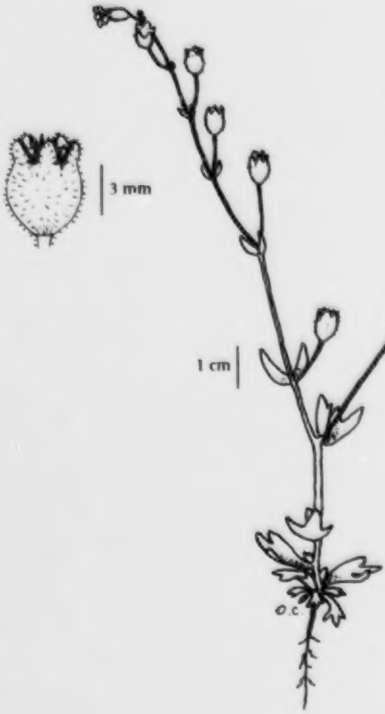
DESCRIPTION:

General: Perennial herb from scaleless stem-bases with many bulblets; stems 10-20 cm tall, glandular-hairy to long-hairy with some glands.

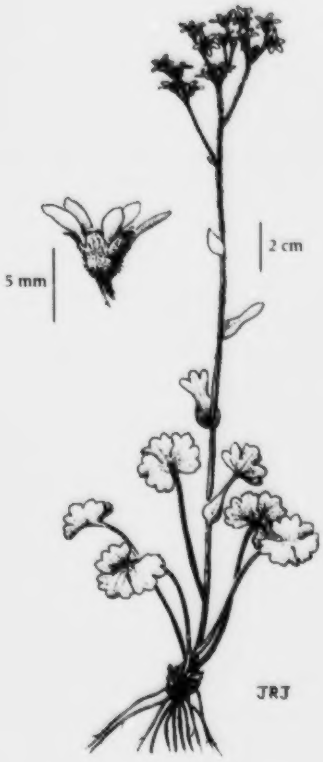
Leaves: Basal leaves 1 to 3, often withered by time of flowering, kidney-shaped, 1.5-2.5 cm wide, coarsely lobed, the stalks slender; stem leaves similar, 3 to 5, the stalks reduced; stipules of stem leaves enlarged, especially upwards.

Flowers: Inflorescence a 2- to 10-flowered terminal cluster, somewhat flat-topped; petals violet, occasionally almost white, 6-9 mm long, spoon-shaped to oblanceolate, slightly unequal, one often lobed; calyces narrowly bell-shaped, joined partly to ovary, 4.5-6 mm long, the lobes linear-lanceolate, about length of rest of calyx, nearly erect, the tips spreading; stamens 5, opposite the calyx lobes.

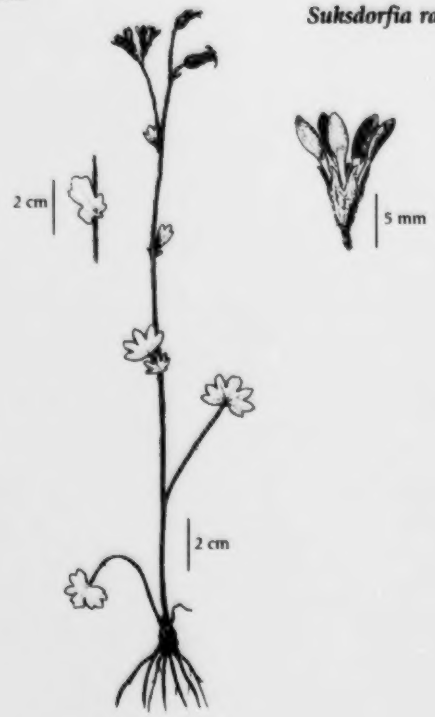
Fruits: Capsules, 4-6 mm long; seeds brown, about 0.5 mm long, warty.



Saxifraga tridactylites



Suksdorfia ranunculifolia



Suksdorfia violacea

TELLIMA

Tellima grandiflora **(Pursh) Dougl. *ex* Lindl.**

fringecup

HABITAT/RANGE:

Moist forests, streambanks and thickets in the lowland and montane zones; common in W and E BC south of 57° N, mostly absent from central BC north of 51° N; N to the Aleutian Islands and S AK, E to AB and S to MT, N ID and CA.

DESCRIPTION:

General: Perennial herb from scaly rhizomes; flowering stems 40-80 cm tall, with a few leaves, strongly long-hairy below, becoming more glandular-hairy above.

Leaves: Basal leaves heart- to kidney-shaped, 3-8 cm wide, about as long, shallowly 5- to 7-lobed, irregularly toothed, the stalks 5-20 cm long, strongly long-hairy; stipules about 5 mm long, membranous, fringed to toothed; stem leaves similar to the basal, 1 to 3, reduced.

Flowers: Inflorescence a many-flowered, spike-like, terminal cluster, generally 1-sided, with scale-like bracts; flower stalks 2-5 mm long; petals greenish-white to rose, 3-7 mm long, pinnately divided at tip into 5 or 7 linear segments, short-clawed, deciduous; calyces greenish, 6-8 mm long, to 11 mm in fruit, joined partly to ovary, hypanthium tubular bell-shaped, longer than joined portion, the lobes triangular-egg-shaped, 2-3 mm long, erect; stamens 10.

Fruits: Capsules, about 4 mm long; seeds brown, 0.8-1 mm long, wrinkled-warty in lengthwise rows.

TIARELLA

Tiarella trifoliata **L.** (*T. lacinata* Hook. = var. *lacinata*, *T. unifoliata* Hook. = var. *unifoliata*)

cut-leaved foamflower (var. *laciniata*), **three-leaved foamflower** (var. *trifoliata*); **one-leaved foamflower** (var. *unifoliata*)

HABITAT/RANGE:

Moist forests, meadows and streambanks in the lowland and montane to subalpine zones; common throughout BC south of 58° N; N to the Aleutian Islands and S AK, E to AB and S to MT, ID and CA.

DESCRIPTION:

General: Perennial herb from scaly rhizomes; flowering stems 20-50 cm tall, with a few leaves, glandular-hairy above.

Leaves: Basal leaves heart-shaped, 3-12 cm wide, about as long, simple and shallowly to deeply 3- to 5-lobed or compound with 3 stalked leaflets that are lobed or deeply cleft, almost to the base, toothed, hairy and usually glandular, the stalks longer than blades, stipules about 1 cm long; stem leaves similar to the basal, 2 or 3, reduced; stipules to 1 mm long.

Flowers: Inflorescence a narrow, many-flowered, terminal cluster, up to 15 cm long, densely glandular-hairy; petals 3-4 mm long, thread-like; calyces bell-shaped, 1.5-2.5 mm long, glandular-hairy, hypanthium bell-shaped, free of ovary, lobed 1/2 to 2/3 length, lobes irregular, the upper lobe largest; stamens 10.

Fruits: Capsules, borne horizontally, one valve 3-5 mm long, the other 7-10 mm long; seeds blackish, about 1.5 mm long, shining, nearly smooth.

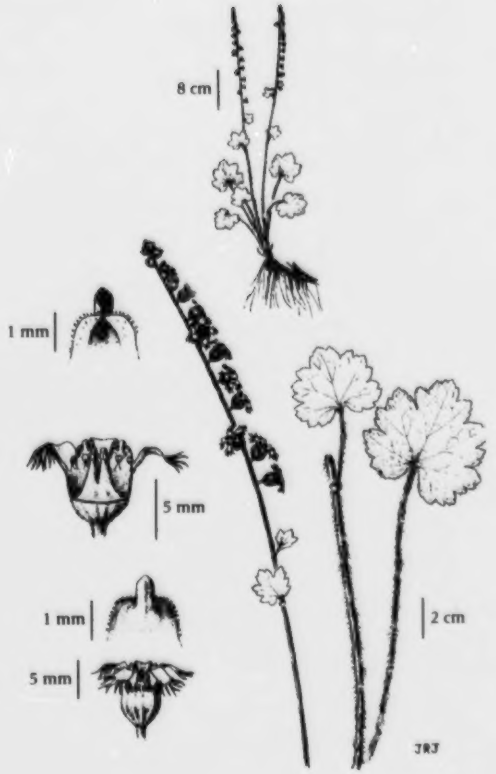
Notes: Three infraspecific taxa have been recognized. These taxa are widely sympatric but var. *trifoliata* generally occurs at lower elevations (up to 650 m), while var. *unifoliata* generally occurs above 650 m. Variety *laciniata* is a hybrid between the latter two and occurs frequently on Vancouver Island and sporadically on the mainland.

1. **Leaves simple, shallowly to deeply 3- to 5-lobed** .... var. ***unifoliata*** **(Hook.) Kurtz**

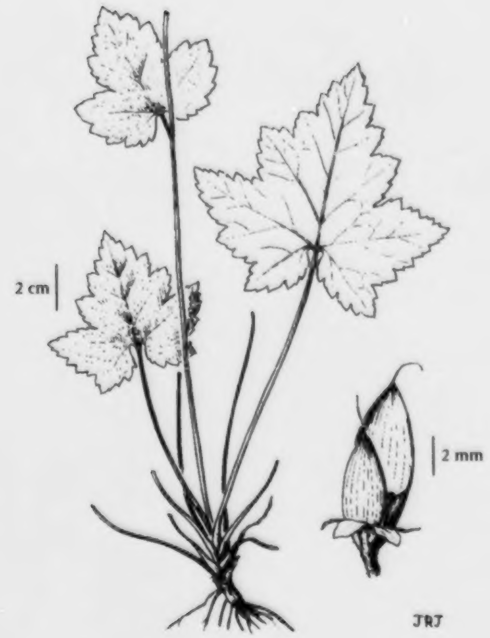
1. **Leaves compound, with 3 stalked leaflets.**

    2. **Leaflets lobed** .... var. ***trifoliata***

    2. **Leaflets deeply cleft, almost to the base** .... var. ***laciniata*** **(Hook.) Wheelock**

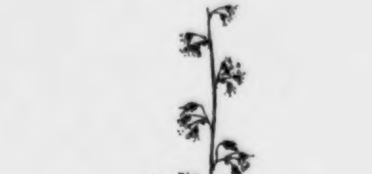

8 cm
1 mm
5 mm
1 mm
5 mm
2 cm
JRJ

Tellima grandiflora



Tiarella trifoliata var. *unifoliata*

Tiarella trifoliata var. *trifoliata*



Tiarella trifoliata var. *laciniata*

TOLMIEA

Tolmiea menziesii **(Pursh) T. & G.**

piggy-back plant; youth-on-age

HABITAT/RANGE:

Moist forests and streambanks in the lowland and montane zones; common in coastal BC; N to AK and S to CA.

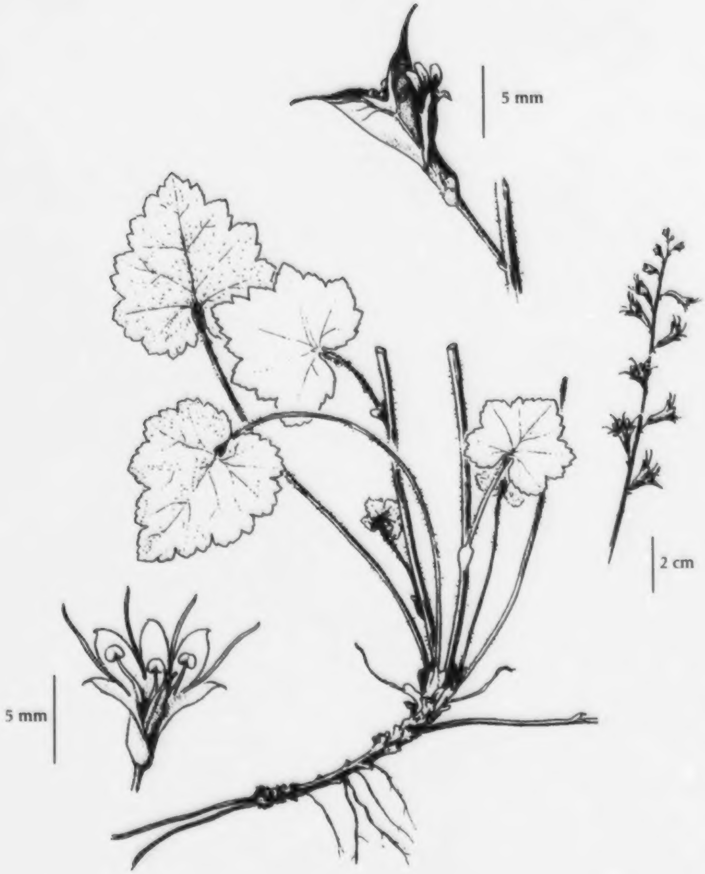
DESCRIPTION:

General: Perennial herb from scaly rhizomes; flowering stems 30-80 cm tall; plants hairy throughout, glandular-hairy above.

Leaves: Basal leaves heart-shaped, 3-10 cm wide, nearly as long, shallowly 5- to 7-lobed, sharply toothed, hairy, sometimes with small buds at base of leaf blades, long-stalked, the stalks hairy; stem leaves few, similar to the basal, reduced; stipules leaf-like, elliptic, 3-8 mm long, irregularly toothed, short-bristly.

Flowers: Inflorescence a many-flowered, spike-like, terminal cluster, 10-30 cm long, the flowers irregular; petals usually 4, brownish-purple, 8-12 mm long, thread-like; calyces greenish-purple to brown, free of ovary, the hypanthium tubular, 5-9 mm long, the upper 3 lobes larger than lower 2, the calyx deeply cleft between lower 2; stamens 3.

Fruits: Capsules, 9-14 mm long, equally 2-valved; seeds about 0.5 mm long, finely spiny.



Tolmiea menziesii

SCROPHULARIACEAE

1. Stem leaves mainly alternate (sometimes the lower ones opposite or whorled, or leaves mainly basal in *Limosella*); corollas spurred or spurless.
    2. Corollas spurred at the base.
        3. Leaves palmately veined and 5- to 9-lobed .... *Cymbalaria*
        3. Leaves pinnately veined, entire or with a few obscure teeth.
            4. Leaves broadly egg- to arrowhead-shaped; plants prostrate .... *Kickxia*
            4. Leaves linear to narrowly lanceolate; plants erect.
                5. Plants glandular-hairy; flowers axillary .... *Chaenorrhinum*
                5. Plants smooth or nearly so; flowers in terminal racemes .... *Linaria*
    2. Corollas not spurred.
        6. Leaves mainly basal; stem leaves, if present, much reduced.
            7. Leaves all basal, entire; stamens 4 .... *Limosella*
            7. Leaves both basal and on the stem, toothed; stamens 2 .... *Besseya*
        6. Leaves mainly on the stem, these not greatly reduced from the basal leaves and gradually reduced upwards.
            8. Stamens 5; corollas wheel-shaped .... *Verbascum*
            8. Stamens 4; corollas tubular to bell-shaped.
                9. Corollas barely 2-lipped; stigmas 2-lobed .... *Digitalis*
                9. Corollas distinctly 2-lipped; stigmas wholly united.
                    10. Upper lip of corolla hood-like, rounded at the top, often extending into a narrow beak or squared-off; calyx lobes usually 5, sometimes only 2 or 4; leaves often both basal and on the stem; anther-cells equal .... *Pedicularis*
                    10. Upper lip of corolla beak-like, more or less straight; calyx lobes 2 to 4; leaves all on the stem; anther-cells unequal, the larger attached by its middle and the smaller by its tips, or the latter absent.
                        11. Tips of beak-like upper corolla lips closed (opening directed downward); stigma not expanded (dot-like) .... *Orthocarpus*
                        11. Tips of beak-like upper corolla lips open; stigma expanded (head-like or 2-lobed).
                            12. Anthers 2-celled; lower corolla lip usually highly reduced, occasionally prominent and once-pouched or rarely 3-pouched .... *Castilleja*
                            12. Anthers 1-celled; lower corolla lip prominent and strongly 3-pouched .... *Triphysaria*

1. Stem leaves mainly opposite or whorled; corollas not spurred.
    13. Calyces 4-lobed.
        14. Stamens 2; corollas barely 2-lipped .... *Veronica*
        14. Stamens 4; corollas distinctly 2-lipped.
            15. Leaves palmately veined .... *Euphrasia*
            15. Leaves pinnately veined or pinnately cleft.
                16. Leaves entire; seeds 2-4 .... *Melampyrum*

16. Leaves toothed; seeds numerous.
    17. Calyces inflated in fruit, strongly flattened; plants not glandular-hairy ...... *Rhinanthus*
    17. Calyces scarcely inflated in fruit, not markedly flattened; plants glandular-hairy .... *Parentucellia*

13. Calyces 5-lobed.
  18. Stamens 5, 1 of these sterile, either elongate or a mere projecting knob or scale on the upper lip; stigmas wholly united.
    19. Sterile stamen elongate; stems round.
      20. Fertile stamens densely hairy at the base, attached to corolla at one level; seeds winged .... *Nothochelone*
      20. Fertile stamens smooth at the base, attached to the corolla at different levels; seeds not winged .... *Penstemon*
    19. Sterile stamen a knob or scale; stems square .... *Scrophularia*
  18. Stamens 2 or 4, all fertile; stigmas various.
    21. Stamens 2; sepals distinct.
      22. Lower sterile stamens minute or absent .... *Gratiola*
      22. Lower sterile stamens represented by a pair of knobs on lower lip at the throat .... *Lindernia*
    21. Stamens 4; sepals various.
      23. Corollas yellow or pink-purple .... *Mimulus*
      23. Corollas blue or blue and white.
        24. Primary leaves or at least some of them compound with 3 leaflets or deeply 3-parted .... *Tonella*
        24. Primary leaves entire or shallowly toothed .... *Collinsia*

BESSEYA

Besseya wyomingensis **(A. Nels.) Rydb.**

Wyoming kitten-tails

HABITAT/RANGE:

Dry grassy slopes and ridges in the alpine zone; rare in SE BC; E to SW SK and S to NE, SD, UT, CO and E ID.

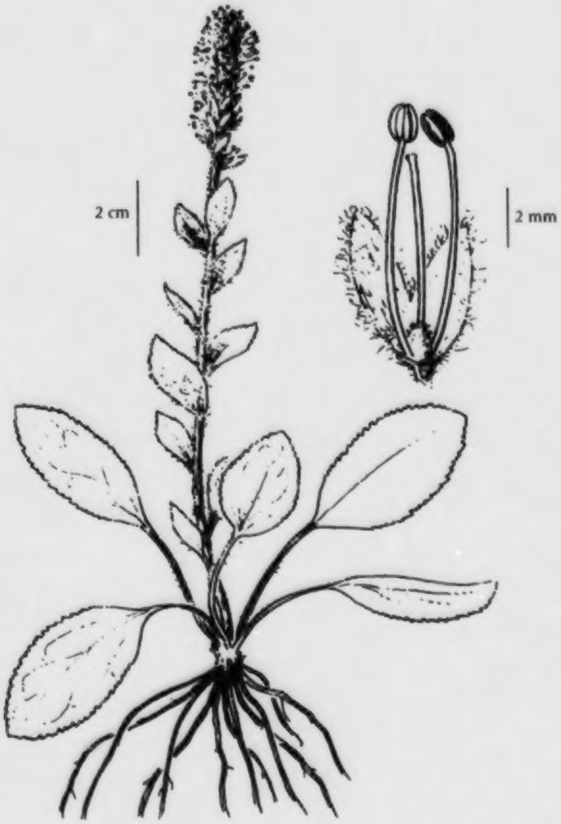
DESCRIPTION:

General: Perennial herb from fibrous roots and a short stem-base; stems 1 to few, erect, 10-40 cm tall, soft-hairy and greyish, especially when young.

Leaves: Basal leaves long-stalked, the stalks 2-8 cm long, the blades broadly egg-shaped to lanceolate or oblong, 2-7 cm long, coarsely blunt-toothed, minutely soft-hairy; stem leaves alternate, smaller, unstalked.

Flowers: Inflorescence a dense, cylindric, leafy-bracted, terminal spike; corollas lacking; calyces asymmetrical, 3-6 mm long, 2 (3)-lobed, the lobes shortly fused at the base, long-hairy; stamens 2, exserted, the filaments dark red or purple, 5-12 mm long.

Fruits: Capsules, broadly oval, somewhat flattened, long-hairy or smooth, 2-chambered; seeds circular, flat, about 4 per chamber.



Besseya wyomingensis

CASTILLEJA[3]

1. Plants annuals; upper lip of corollas not much exceeding the lower lips.

2. Bracts green throughout; lower lips of corollas with inconspicuous teeth .... *C. tenuis*

2. Bracts (or some of them) tipped with white, yellow, or purple; lower lips of corollas with evident teeth.

3. Corollas linear, the lower lips scarcely expanded; slender plants of mesic meadows in the lowland zone .... *C. attenuata*

3. Corollas club-shaped, the lower lips expanded; stouter plants of tidal marshes or brackish sites in the lowland zone .... *C. ambigua*

1. Plants perennials, or if annuals (*C. exilis*) the upper lip much exceeding the lower lip.

4. Plants annuals, generally single-stemmed; leaves and bracts entire, linear-lanceolate, the bracts scarlet; corollas yellowish .... *C. minor*

4. Plants perennials, generally 2- to several-stemmed; leaves and bracts entire or lobed, if bracts entire then broadly rounded; bracts and corollas various.

5. Beak-like upper corolla lips 3-13 mm long (if greater than 10 mm then the inflorescences greenish or yellowish); bracts usually yellowish, sometimes pinkish, dark red or purplish.

6. Lower corolla lips (2) 3-6.5 mm long, the lobes somewhat petal-like.

7. Leaves entire; bracts rose-pink to violet-purple; plants of N BC .... *C. raupii*

7. Leaves divided above; bracts yellowish; plants of SC and SE BC.

8. Calyx segments usually blunt to rounded; stems and leaves sticky long-soft-hairy .... *C. cusickii*

8. Calyx segments usually sharp-pointed; stems and leaves harshly hairy or long-soft-hairy, sometimes glandular .... *C. thompsonii*

6. Lower corolla lips 1-3 (4) mm long, the lobes reduced to teeth.

9. Inflorescences purple, crimson, rose, pink or white .... *C. parviflora*

9. Inflorescences yellow or greenish, occasionally reddish or purplish.

10. Stems and leaves glandular-hairy below the inflorescence .... *C. levisecta*

10. Stems and leaves not glandular-hairy below the inflorescence (except rarely obscurely so in *C. occidentalis*).

11. Bracts narrowly lanceolate, not concealing the flowers; inflorescences minutely to coarsely white-hairy.

12. Leaves entire, sometimes the uppermost with a pair of short lateral lobes; plants of N BC .... *C. fulva*[4]

12. Leaves lobed with 1-2 pairs of slender lateral lobes; plants of SC and SE BC .... *C. cervina*

11. Bracts lanceolate to egg-shaped, usually concealing the flowers; inflorescences nearly smooth to long-soft-hairy, often with yellowish hairs.

13. Plants 6-16 (25) cm tall.

14. Leaves entire, sometimes the uppermost with a pair of short lateral lobes; plants of SE BC .... *C. occidentalis*

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[3] Key adapted from Holmgren (1973a) and Chuang & Heckard (1993).

[4] This species has not been collected in BC since 1940. See Excluded Species.

14. Leaves lobed with 1-2 pairs of slender lobes, becoming entire below; plants of NW BC .... *C. hyperborea*

13. Plants 25-50 (80) cm tall.

15. Bracts with 1 to 2 pairs of long, slender lateral lobes; stems and leaves usually rough-short-hairy .... *C. lutescens*

15. Bracts entire or with 1 pair of shorter lateral lobes; stems and leaves smooth or nearly so to long-soft-hairy or sticky-long-hairy.

16. Lateral lobes of calyces 3-10 mm long; plants of NW BC and the Queen Charlotte Islands .... *C. unalaschcensis*

16. Lateral lobes of calyces 1-4 mm long; plants of SE BC .... *C. sulphurea*

5. Beak-like upper corolla lips (7) 10-20 mm long (if less than 10 mm then the inflorescences red or purplish); bracts usually red to purplish, rarely yellowish or whitish.

17. Leaves usually entire, rarely somewhat lobed above.

18. Inflorescences reddish (scarlet) or sometimes red-orange to yellowish; calyx segments linear to lanceolate, long-tapering to a pointed tip; plants usually more than 30 cm tall .... *C. miniata*

18. Inflorescences purplish to crimson; calyx segments short-pointed to blunt; plants usually less than 30 cm tall.

19. Plants nearly smooth or only obscurely sticky long-soft-hairy in the inflorescence; bracts usually with 1-2 pairs of short lateral lobes .... *C. rhexifolia*

19. Plants strongly sticky long-soft-hairy in the inflorescence; bracts entire or rarely somewhat lobed .... *C. elmeri*

17. Leaves, at least the upper ones, with 1 to 3 pairs of linear, spreading, lateral lobes.

20. Stems and leaves long-soft-hairy with crinkled hairs; stems 10-20 (30) cm tall; plants high subalpine and alpine, rare in the Cascade Mountains .... *C. rupicola*

20. Stems and leaves sometimes bristly with long multicellular hairs; stems 20-60 cm tall; plants lowland to montane, frequent throughout S BC .... *C. hispida*

Castilleja ambigua* (Benth.) Chuang & Heckard ssp. *ambigua (*Orthocarpus castillejoides* Benth.)
paintbrush owl-clover

HABITAT/RANGE:

Moist to wet tidal marshes or open grassy brackish sites in the lowland zone; rare on S Vancouver Island; S to CA.

DESCRIPTION:

General: Annual herb from a taproot; stems decumbent to ascending, 10-35 cm long/tall, simple or often branched, minutely to coarsely spreading-hairy.

Leaves: Alternate, unstalked, lanceolate to oblong or egg-shaped, 1-5 cm long, entire below, pinnately 3- to 5-toothed or -lobed above, rough-short-hairy.

Flowers: Inflorescence a dense, compact, prominently bracted, terminal spike 3-12 cm long, the bracts greenish tipped with white, yellow or pink, 14-22 mm long, oblong to egg-shaped, differing gradually from the leaves, becoming palmately cleft into 2 to 8, short, blunt or rounded lobes; corollas yellow with purple markings, 14-25 mm long, exceeding the bracts and calyces, tubular, club-shaped, 2-lipped, the upper lip beak-like, minutely hairy, straight, 4-5 mm long, the lower lip 3-4 mm long, somewhat inflated, 3-pouched, tipped with 3 erect, slender, purple teeth 1-3 mm long; calyces tubular, long-hairy, 12-20 mm long, 2-cleft, each segment 2-lobed, the lobes linear, shorter than the tube, coloured like the tips of the bracts; stamens 4.

Fruits: Capsules, ellipsoid, 8-12 mm long; seeds several, 1-2 mm long, with tight-fitting netted coats.

***Castilleja attenuata* (A. Gray) Chuang & Heckard** (*Orthocarpus attenuatus* A. Gray)
narrow-leaved owl-clover

HABITAT/RANGE:

Mesic meadows, grassy slopes and fields in the lowland zone; locally frequent on S Vancouver Island and the Gulf Islands; S to AZ and CA.

DESCRIPTION:

General: Annual herb from a taproot; stems erect, 10-35 cm tall, slender, usually unbranched, spreading-hairy.

Leaves: Alternate, unstalked, linear-lanceolate, long-tapering to a sharp tip, 2-6 cm long, entire or the upper often with a pair of narrow lateral lobes, spreading-hairy.

Flowers: Inflorescence an elongate, narrow, prominently bracted, terminal spike 3-20 cm long, dense to rather open below, the bracts 15-20 mm long, differing gradually from the leaves, becoming shorter and more deeply cleft into 3 lanceolate lobes, green with white or yellowish tips; corollas white with purple spots on lower lip, minutely hairy, 10-25 mm long, linear-tubular, 2-lipped, the upper lip beak-like, straight, 4-5 mm long, the lower lip 3-4 mm long, scarcely expanded, narrowly 3-pouched, tipped with 3 erect, slender teeth 1-1.5 mm long; calyces tubular, 10-20 mm long, very hairy, 2-cleft, each segment 2-lobed, the lobes shorter than the tube, white-tipped; stamens 4.

Fruits: Capsules, ellipsoid, 7-11 mm long; seeds several, less than 1 mm long, with loose netted coats.

***Castilleja cervina* Greenm.**
deer paintbrush

HABITAT/RANGE:

Dry grasslands, rocky slopes and open forests in the steppe and montane zones; infrequent in SC, frequent in SE BC; S to MT, N ID and NE WA.

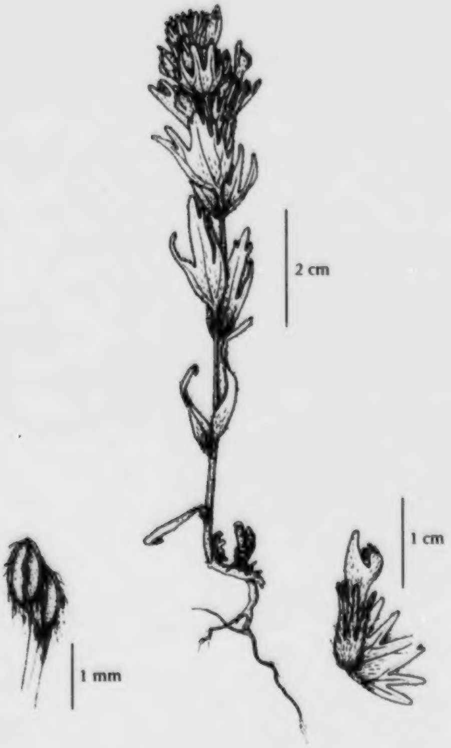
DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems several, clustered, erect, 30-60 cm tall, usually branched above, short-curly-hairy or smooth, sometimes purplish.

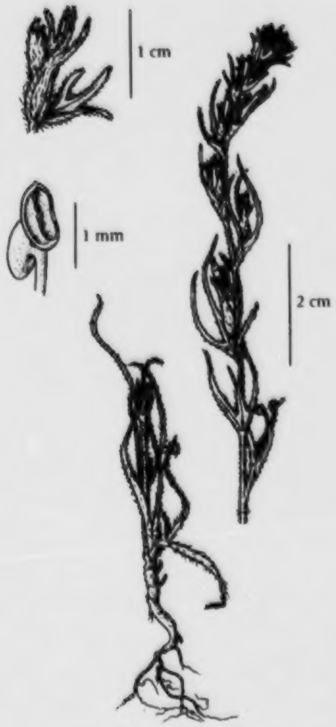
Leaves: Alternate, short-curly-hairy or rarely smooth, the lower leaves linear, entire, the upper ones deeply divided, with a pair of linear spreading lobes.

Flowers: Inflorescence a prominently bracted terminal spike, narrow and ultimately elongate, the bracts yellowish, broader than the leaves, deeply 3- to 5-lobed, short-curly-hairy; corollas 18-25 mm long, slightly longer than and exserted from the calyces, 2-lipped, the upper lip beak-like, minutely hairy, shorter than the tube and 2-4 times the length of the 3-lobed lower lip, the lobes minutely hairy; calyces hairy, 15-20 mm long, 2-lobed, these primary lobes again divided into 2 slender, sharp-pointed segments 2-3 mm long; stamens 4.

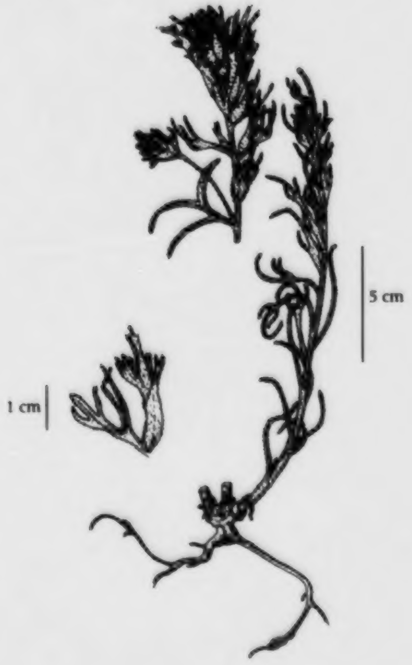
Fruits: Capsules; seeds many, the seed-coats loose, net-veined.



Castilleja ambigua ssp. *ambigua*



Castilleja attenuata



Castilleja cervina

Castilleja cusickii **Greenm.**

Cusick's paintbrush

HABITAT/RANGE:

Mesic meadows in the montane zone; rare in SC and SE BC; E to SW AB and S to W WY, ID NV and NE OR.

DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems several, clustered, ascending to erect, often from decumbent bases, 10-50 cm tall, usually unbranched, sticky long-soft-hairy.

Leaves: Alternate, appressed-ascending and overlapping, often obscuring the stem, sticky long-soft-hairy, the lower leaves linear-lanceolate and entire, the upper ones broader, 2-6 cm long, with 1 to 3 pairs of linear spreading lobes, mostly from above the middle.

Flowers: Inflorescence a prominently bracted terminal spike, narrow and ultimately elongate, the bracts pale yellow, oblong, wider than the leaves and concealing the flowers, blunt to rounded at the top, glandular-hairy, with 1 or 2 pairs of short narrow lobes; corollas 20-28 mm long, 2-lipped, the upper lip beak-like, densely glandular-short-hairy, 4-7 mm long, included in the calyx or slightly exserted, much shorter than the tube, from slightly longer than to 3 times as long as the prominent, 3-lobed, lower lip; calyces often purplish, hairy, 20-30 mm long, deeply 2-lobed, these primary lobes broad and usually rounded at the top, entire or notched; stamens 4.

Fruits: Capsules, 10-13 mm long; seeds many, the seed-coats loose, net-veined.

Castilleja elmeri **Fern.**

Elmer's paintbrush

HABITAT/RANGE:

Mesic meadows in the montane and subalpine zones; locally frequent in the Cascade Mountains, SC BC; S to NW WA.

DESCRIPTION:

General: Perennial herb from a stout, somewhat woody stem-base; stems several, clustered, ascending to erect, 15-30 cm tall, usually unbranched, finely sticky glandular-hairy, especially in the inflorescence.

Leaves: Alternate, linear-lanceolate, mostly entire, or the upper sometimes with a pair of short lobes, sticky short-hairy to glandular-long-hairy.

Flowers: Inflorescence a prominently bracted terminal spike, the bracts crimson to scarlet, occasionally yellowish, oblong-egg-shaped, entire and rounded or rarely with a pair of short lobes near the top, sticky-long-hairy; corollas greenish, 20-30 mm long, 2-lipped, the upper lip beak-like, short-hairy, 8-12 mm long, nearly as long as the tube and 4-5 times the length of the thickened, 3-toothed lower lip; calyces hairy, 15-25 mm long, 2-lobed, these primary lobes again divided into 2 oblong, blunt, 1- to 4-mm long segments; stamens 4.

Fruits: Capsules; seeds many, the seed-coats loose, net-veined.

Castilleja hispida **Benth. var.** ***hispida***

harsh paintbrush

HABITAT/RANGE:

Mesic meadows and open forests in the lowland, steppe and montane zones; frequent in S BC; E to SW AB and S to NW MT, ID and CA.

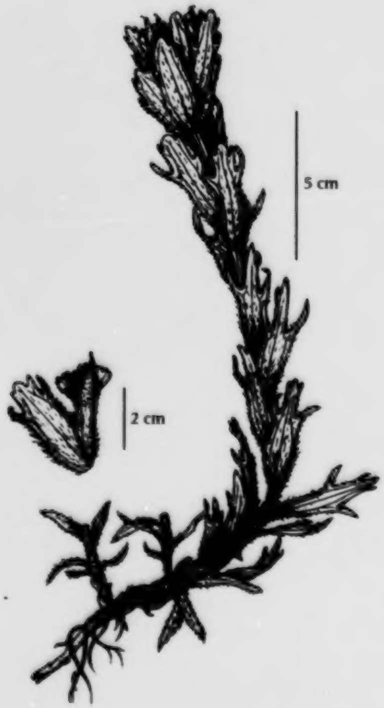
DESCRIPTION:

General: Perennial herb from a stout, somewhat woody stem-base; stems several, clustered, ascending to erect, 20-60 cm tall, usually unbranched, finely long-soft-hairy to sometimes bristly-hairy, especially above.

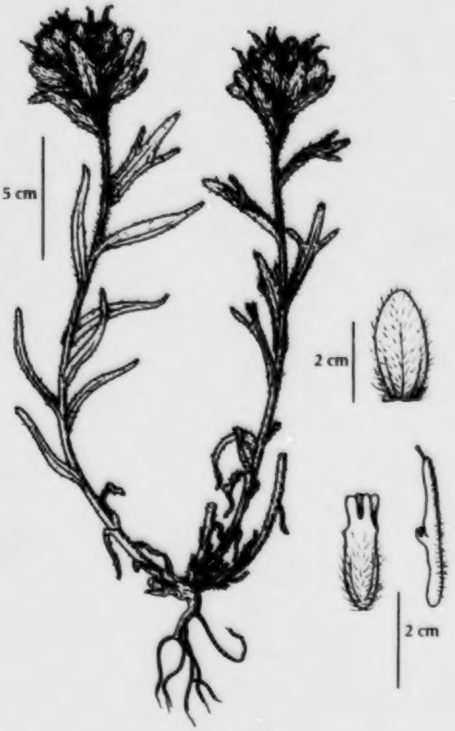
Leaves: Alternate, lanceolate to narrowly egg-shaped, finely soft-hairy to sometimes sticky-long-hairy, the lower leaves entire and reduced, the upper ones usually with 1 to 2 pairs of narrow lobes above the middle.

Flowers: Inflorescence a prominently bracted terminal spike, at first compact, later elongating in fruit, the bracts bright red to scarlet, occasionally yellowish, oblong-egg-shaped, deeply 3- to 5-lobed above the middle, minutely hairy and also long-soft-hairy; corollas greenish, 20-40 mm long, 2-lipped, the upper lip beak-like, short-hairy, about as long as the tube and 5 or more times the length of the thickened, 3-toothed lower lip; calyces hairy, 15-30 mm long, deeply 2-lobed, these primary lobes again divided into 2 rounded, 1- to 7-mm long segments; stamens 4.

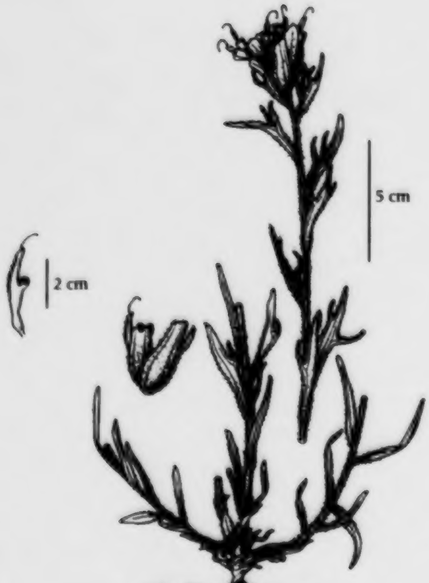
Fruits: Capsules; seeds many, the seed-coats loose, net-veined.



Castilleja cusickii



Castilleja elmeri



Castilleja hispida var. *hispida*

***Castilleja hyperborea* Pennell** (*C. villosissima* Pennell)
northern paintbrush; northern Indian-paintbrush
HABITAT/RANGE:
Moist to mesic tundra and stony slopes and ridges in the subalpine and alpine zones; rare in extreme NW BC; amphiberingian, N to AK, YT and NT; NE Siberia.
DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems several, clustered, erect or ascending, 7-16 cm tall, unbranched, sparsely to densely coarse-hairy to long-soft-hairy, especially in the inflorescence.

Leaves: Alternate, lance-linear, long-tapering to the sharp-pointed tips, 1.5-4 cm long, with 1 or 2 pairs of slender spreading lobes, or the lowermost entire.

Flowers: Inflorescence a prominently bracted terminal spike, compact at first, elongating to 1/4-1/2 the plant height, the bracts yellow to yellowish-green, lanceolate to lance-oblong, usually lobed, long-soft-hairy; corollas greenish, 10-22 mm long, 2-lipped, the upper lip beak-like, 5-8 mm long, the lower lip 3-5 mm long, with 3 yellowish lobes; calyces yellowish, 10-20 mm long, 2-lobed, these primary lobes rounded, again divided into 2 segments 0.5-1.5 mm long; stamens 4.

Fruits: Capsules, 9-13 mm long; seeds many, the seed-coats loose, net-veined.

***Castilleja levisecta* Greenm.**
golden paintbrush; golden Indian-paintbrush
HABITAT/RANGE:
Dry to mesic, grassy meadows in the lowland zone; rare on SE tip of Vancouver Island and adjacent islands; S to OR.
DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems several, clustered, decumbent or creeping at the base, 10-50 cm tall, unbranched, sticky with long, soft, glandular hairs, especially above.

Leaves: Alternate, lanceolate, sticky-long-hairy to minutely stiff-hairy, the lower leaves linear-lanceolate, entire, the upper ones oblong-egg-shaped with 1 to 3 pairs of short lateral lobes near the top.

Flowers: Inflorescence a prominently bracted terminal spike, the spike narrow and ultimately elongate, the bracts golden-yellow, oblong, blunt, about as wide as the upper leaves, with 1 to 3 pairs of short lobes near the top, minutely hairy and also sticky-long-hairy, as long as and mostly concealing the flowers; corollas 20-23 mm long, 2-lipped, the upper lip beak-like, minutely hairy, shorter than the tube and 3-4 times as long as the lower lip; calyces long-hairy, 15-18 mm long, deeply 2-lobed, these primary lobes again divided into 2 linear, blunt segments; stamens 4.

Fruits: Capsules; seeds many, the seed-coats loose and net-veined.

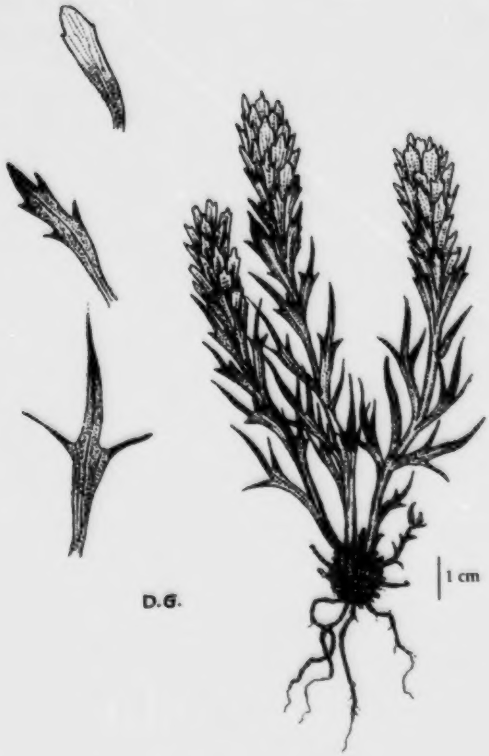
***Castilleja lutescens* (Greenm.) Rydb.**
yellowish paintbrush
HABITAT/RANGE:
Dry grassy or rocky slopes and open forests in the steppe and montane zones; infrequent in SE BC; E to SW AB and S to MT, ID and NE OR.
DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems several, clustered, ascending to erect, 30-60 cm tall, often branched above, minutely to coarsely hairy, sometimes purplish.

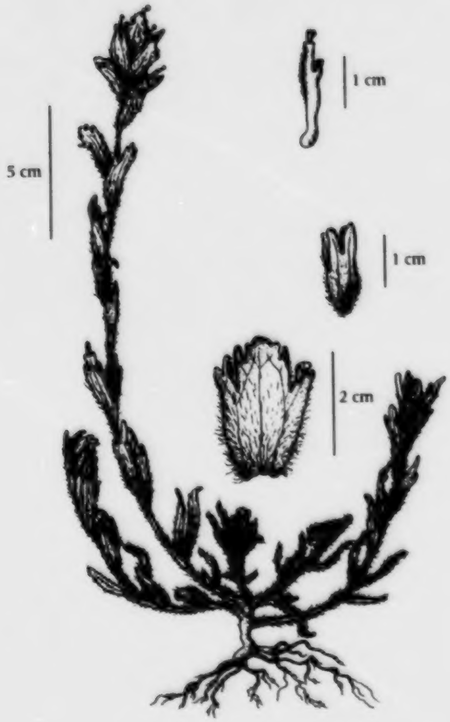
Leaves: Alternate, linear to narrowly lanceolate, mostly entire, but the upper ones sometimes with a pair of sharp-pointed, linear lobes, rough-short-hairy.

Flowers: Inflorescence a prominently bracted terminal spike, the bracts yellow, oblong, rounded, with 3 to 5 narrow lobes or rarely entire, densely short-hairy; corollas greenish, 15-30 mm long, 2-lipped, the upper lip beak-like, minutely hairy, usually exserted 1-10 mm beyond the calyx, less than 1/2 the length of the tube and 2-5 times the length of the 3-lobed lower lip; calyces hairy, 15-25 mm long, deeply 2-lobed, these primary lobes again divided into 2 triangular or linear, sharp-pointed segments 1-7 mm long; stamens 4.

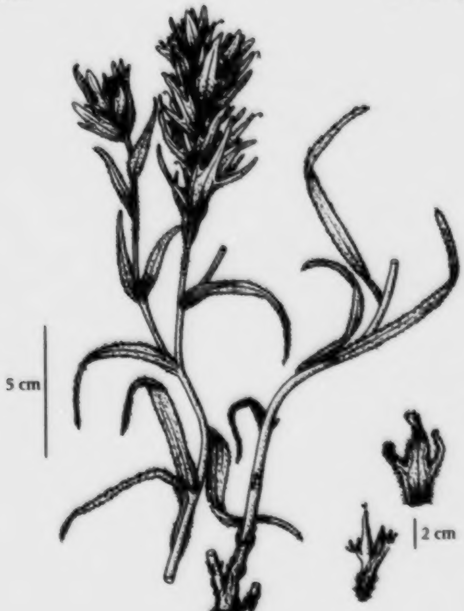
Fruits: Capsules; seeds many, the seed-coats loose, net-veined.



Castilleja hyperborea


5 cm
1 cm
1 cm
2 cm

Castilleja levisecta



Castilleja lutescens

Castilleja minor* (A. Gray) A. Gray ssp. *minor (*C. exilis* A. Nels.)

annual paintbrush

HABITAT/RANGE:

Alkaline marshes, wet meadows and gravelly seepage areas in the steppe and lower montane zones; rare in SC and SE BC; S to NM, AZ and NV.

DESCRIPTION:

General: Annual herb from a short taproot or small branched root system; stems erect, 30-80 cm tall, usually single and unbranched, sometimes branched above, glandular-hairy.

Leaves: Alternate, linear to narrowly lanceolate, 3-8 cm long, long-tapering to a sharp tip, entire, glandular-hairy.

Flowers: Inflorescence a prominently bracted terminal spike, narrow and elongate, the flowers spaced apart, the bracts leaflike, the upper ones red- or scarlet-tipped, lanceolate, entire, glandular, much longer than the flowers; corollas yellowish, 15-25 mm long, 2-lipped, the upper lip short and blunt, short-hairy, 5-7 mm long, shorter than the tube, 4-5 times as long as the much-reduced lower lip, the lower lip 1-3 mm long, the teeth obsolete; calyces green, hairy, 15-20 mm long, deeply 2-lobed, these primary lobes again divided into 2 linear, sharp segments 1-3 mm long; stamens 4.

Fruits: Capsules, 10-18 mm long; seeds many, the seed-coats loose, net-veined.

***Castilleja miniata* Dougl. ex Hook.** (*C. chrymactis* Pennell, *C. dixonii* Fern., *C. gracillima* Rydb., *C. hyetophila* Pennell)

scarlet paintbrush; common red paintbrush

HABITAT/RANGE:

Wet to dry meadows, grassy slopes, fens, shrub-carrs, tidal marshes, clearings, roadsides, thickets and open forests from the lowland to subalpine zones; common throughout BC south of 57° N, infrequent northward and rare on the Queen Charlotte Islands; N to SE AK, E to W ON and S to ND, NM, AZ and CA.

DESCRIPTION:

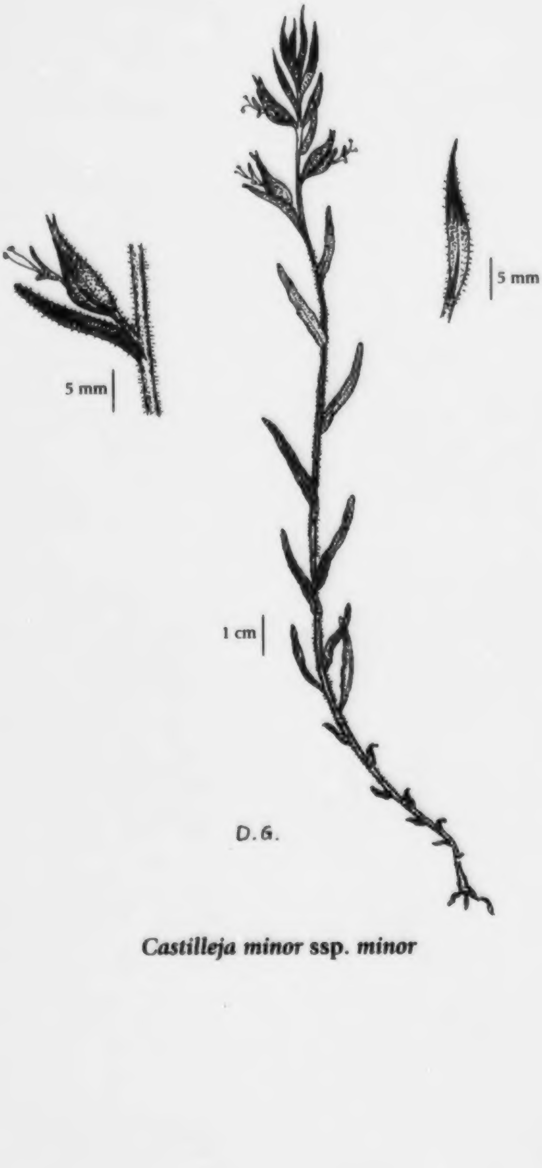
General: Perennial herb from a stout, scaly, somewhat woody stem-base; stems several and clustered or solitary on rhizomes, ascending to erect, 20-80 cm tall, simple or sometimes branched above, more or less smooth below, hairy above especially in the inflorescence.

Leaves: Alternate, lance-linear to lanceolate, 3-10 cm long, entire, long-tapering to sharp-pointed tip, appressed-rough-hairy to nearly smooth.

Flowers: Inflorescence a prominently bracted terminal spike, the bracts bright red or scarlet to orange, occasionally crimson or rarely yellow, lanceolate to oblong-egg-shaped, with 1 to 2 pairs of sharp lobes or teeth near the top or rarely entire, hairy and often sticky; corollas greenish, 20-40 mm long, 2-lipped, the upper lip beak-like, short-hairy, 9-20 mm long, 3/4 to about as long as the tube and 5 or more times the length of the thickened, 3-toothed lower lip; calyces red to scarlet, hairy, 15-30 mm long, deeply 2-lobed, these primary lobes again divided into 2 linear to lanceolate, sharp-pointed, 3- to 9-mm long segments; stamens 4.

Fruits: Capsules, 9-12 mm long; seeds many, the seed-coats loose, net-veined.

Notes: Appears to hybridize frequently with *Castilleja unalaschcensis*, and perhaps also *C. hispida* and *C. rhexifolia*.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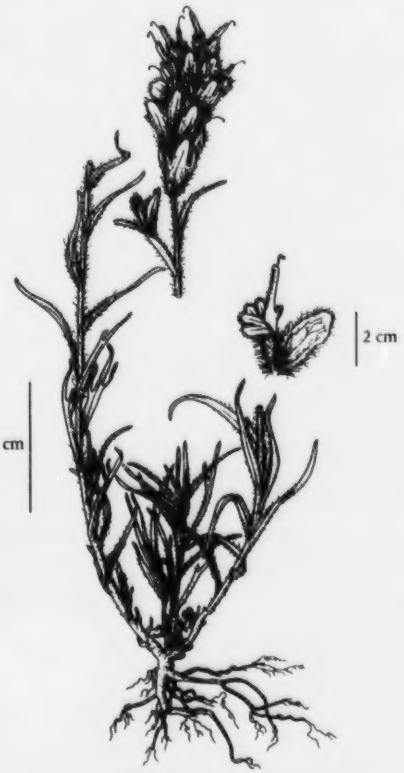
D.G.

Castilleja minor ssp. *minor*



Castilleja miniata

***Castilleja occidentalis* Torr.**

western paintbrush

HABITAT/RANGE:

Mesic to dry meadows and rocky slopes in the subalpine and alpine zones; infrequent in SE BC; E to SW AB and S to CO and UT.

DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems several, clustered, decumbent to erect, 5-20 cm tall, unbranched, more or less sticky-long-hairy, usually purplish.

Leaves: Alternate, linear to lanceolate, 2-5 cm long, entire or sometimes the uppermost with a pair of small lateral lobes, sticky-hairy.

Flowers: Inflorescence a prominently bracted terminal spike, short and compact, the bracts pale yellow, often with a brownish, purplish or reddish cast, broadly lanceolate to egg-shaped, entire and rounded or with 1 to 2 pairs of small lobes near the top, strongly sticky-hairy; corollas 17-25 mm long, 2-lipped, the upper lip beak-like, minutely hairy, 5-9 mm long, much shorter than the tube and 3-4 times the length of the 3-toothed lower lip; calyces 15-20 mm long, 2-lobed, these primary lobes again divided into 2 blunt segments 1-4 mm long; stamens 4.

Fruits: Capsules, 8-10 mm long; seeds many, the seed-coats loose, net-veined.

***Castilleja parviflora* Bong.** (*C. henryae* Pennell, *C. oreopola* Greenm., *C. parviflora* var. *albida* [Pennell] Ownbey, *C. parviflora* var. *olympica* [G.N. Jones] Ownbey)

small-flowered paintbrush

HABITAT/RANGE:

Moist to mesic meadows, heath, streambanks and rocky slopes in the subalpine and alpine zones; frequent throughout BC; N to YT, E to SW AB and S to CA.

DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems several, clustered, erect or ascending, 10-30 (50) cm tall, unbranched, nearly smooth to thinly long-soft-hairy.

Leaves: Alternate, lanceolate, 1.5-5 cm long, nearly smooth to sparsely soft-hairy, all except the lowermost cleft into 3 to 5 lateral lobes, the lobes usually much narrower than the mid-blade.

Flowers: Inflorescence a prominently bracted terminal spike, the bracts rose-pink, magenta, crimson or sometimes whitish, lanceolate to egg-shaped, 3- to 5-lobed, long-soft-hairy, about as long as the flowers; corollas greenish, 12-25 mm long, 2-lipped, the upper lip beak-like, minutely hairy, 3-7 mm long, about as long as the tube and 3 or more times as long as the thickened, 3-toothed, lower lip; calyces 10-20 mm long, 2-lobed, these primary lobes again divided into 2 segments 3-6 mm long, coloured like the bracts; stamens 4.

Fruits: Capsules, egg-shaped, smooth, 8-11 mm long; seeds many, the seed-coats loose and net-veined.

***Castilleja raupii* Pennell**

Raup's paintbrush; Raup's Indian-paintbrush

HABITAT/RANGE:

Swamps, streamsides, riverbars, shores and wet meadows in the montane zone; infrequent in extreme NE BC; N to AK, YT and NT and E to W PQ.

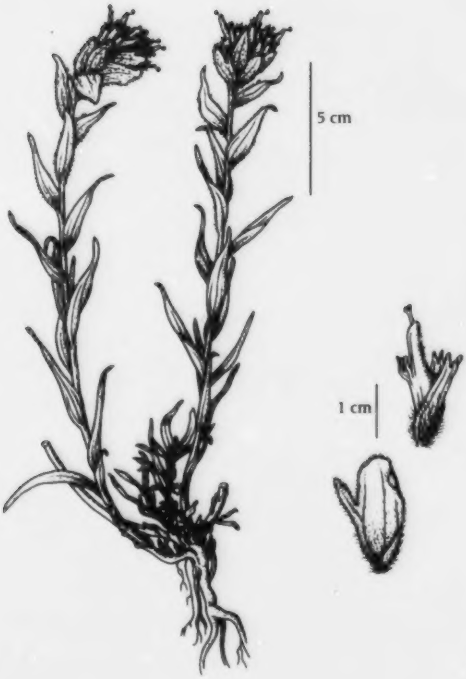
DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems 1 to several, clustered, erect or ascending, 20-50 cm tall, slender, simple or branched above, green or purplish, sparsely hairy below, minutely hairy to long-silky-hairy or cobwebby above.

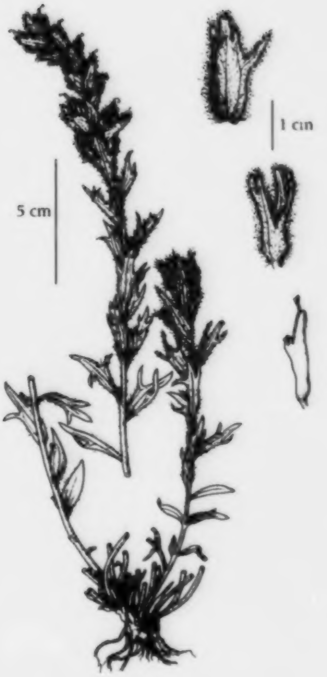
Leaves: Alternate, linear to lance-linear, 2-8 cm long, narrowly long-tapering to the sharp tips, entire or occasionally with a pair of slender lateral lobes, finely hairy on both surfaces.

Flowers: Inflorescence a prominently bracted, terminal, ultimately elongate spike, the bracts rose-pink to violet-purple, oblong or oval to lanceolate, usually with a pair of short linear lateral lobes, sometimes entire, minutely hairy or with long-hairy margins; corollas 15-20 (25) mm long, 2-lipped, the upper lip beak-like, coarse-hairy, green with wide, smooth, purplish margins, 4-6 mm long, shorter than the tube and about 2 times as long as the prominent, violet-purple, 3-lobed lower lip; calyces coloured like the bracts, coarse-hairy towards the base, minutely hairy above, 13-20 mm long, 2-lobed, these primary lobes again cleft into 2 short segments; stamens 4.

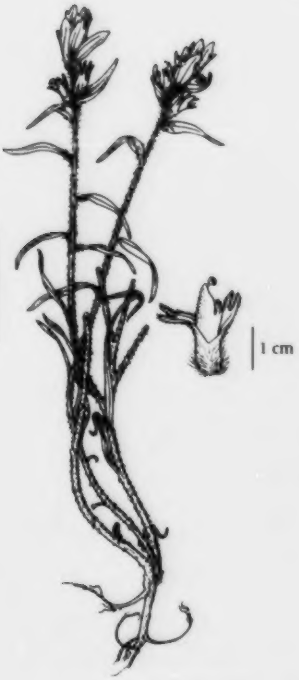
Fruits: Capsules, 8-11 mm long; seeds many, the seed-coats loose and net-veined.



Castilleja occidentalis



Castilleja parviflora



Castilleja raupii

***Castilleja rhexifolia* Rydb.**

alpine paintbrush; rhexia-leaved paintbrush

HABITAT/RANGE:

Mesic to moist meadows and rocky slopes in the subalpine and alpine zones; infrequent in S BC north to 53° N; E to SW AB and S to NM, UT, NV and OR.

DESCRIPTION:

General: Perennial herb from a stout, somewhat woody stem-base; stems several, clustered, ascending to erect, 10-40 cm tall, usually unbranched, nearly smooth to soft-hairy or sometimes sticky glandular-hairy, especially in the inflorescence.

Leaves: Alternate, linear to lanceolate, 3-7 cm long, entire, or the upper sometimes with a few short lobes, nearly smooth to finely soft-hairy or glandular-hairy, the veins prominent.

Flowers: Inflorescence a prominently bracted terminal spike, at first compact, later elongating in fruit, the bracts usually crimson to purplish, occasionally scarlet or yellowish, egg-shaped to oblong, with 1 to 2 pairs of short lobes near the top, or entire and rounded, soft-hairy and sometimes sticky-hairy; corollas greenish, 20-35 mm long, 2-lipped, the upper lip beak-like, short-hairy, 8-12 mm long, much shorter than the tube and 4-5 times the length of the thickened, 3-toothed lower lip; calyces hairy, 15-25 mm long, deeply 2-lobed, these primary lobes again divided into 2 lanceolate, usually blunt, 3- to 6-mm long segments; stamens 4.

Fruits: Capsules, about 12 mm long; seeds many, the seed-coats loose, net-veined.

***Castilleja rupicola* Piper**

cliff paintbrush

HABITAT/RANGE:

Dry to mesic cliffs and rocky slopes from the upper montane to alpine zones; rare in the Cascade Mountains; S to OR.

DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems several, clustered, ascending to erect, 10-20 cm tall, unbranched, thinly long-soft-hairy with crinkly hairs.

Leaves: Alternate, all divided into 3 to 5 (7) linear, spreading lobes, or rarely the lowermost entire, the lateral lobes not much narrower than the mid-blade, finely long-soft-hairy.

Flowers: Inflorescence a prominently bracted terminal spike, compact and relatively few-flowered, the bracts bright scarlet or crimson, mostly deeply 5-lobed, much shorter than the flowers, minutely hairy and also long-soft-hairy; corollas greenish, 25-35 (45) mm long, 2-lipped, the upper lip beak-like, short-hairy, about equalling or slightly longer than the tube and much longer than the thickened, 3-toothed lower lip; calyces long-hairy, 15-25 mm long, deeply 2-lobed, these primary lobes again divided into 2 blunt or sharp, 1- to 5-mm long segments; stamens 4.

Fruits: Capsules; seeds many, the seed-coats loose, net-veined.

***Castilleja sulphurea* Rydb.**

sulphur paintbrush

HABITAT/RANGE:

Moist meadows in the subalpine and alpine zones; locally frequent in SE BC; E to AB and S to SD, NM, AZ and WA.

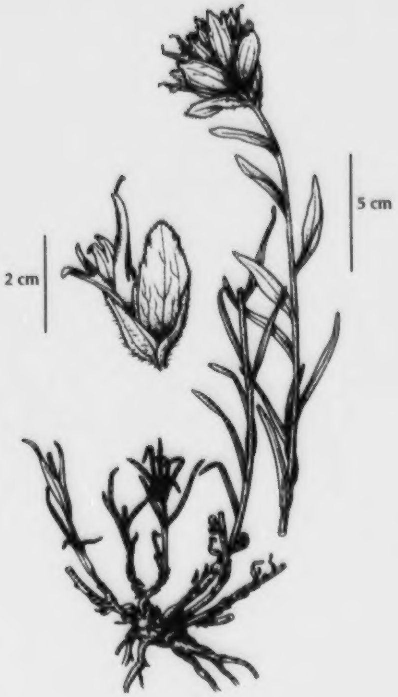
DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems several, clustered, decumbent to erect, 5-20 cm tall, unbranched, more or less sticky-long-hairy, usually purplish.

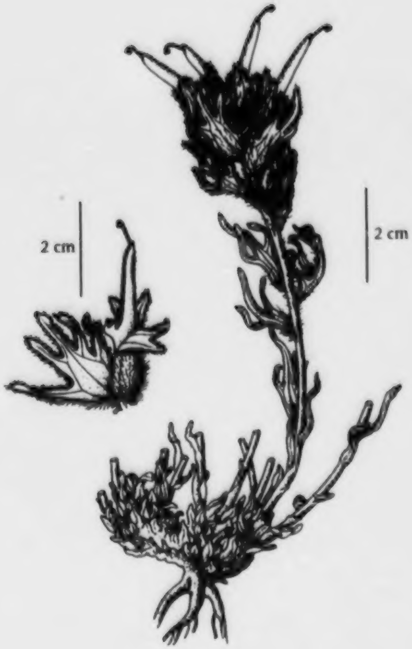
Leaves: Alternate, linear to lanceolate, 2-5 cm long, entire or sometimes the uppermost with a pair of small lateral lobes, sticky-hairy.

Flowers: Inflorescence a prominently bracted terminal spike, at first compact, later elongating, the bracts pale yellow, oblong-egg-shaped, entire and rounded or with 1 to 2 pairs of small lobes near the top, long-hairy and glandular-short-hairy; corollas greenish, 18-30 mm long, 2-lipped, the upper lip beak-like, minutely hairy, 6-12 mm long, shorter than the tube and 3-4 times the length of the thickened, 3-toothed lower lip; calyces hairy, 15-25 mm long, 2-lobed, these primary lobes again divided into 2 blunt or sharp segments 1-4 mm long; stamens 4.

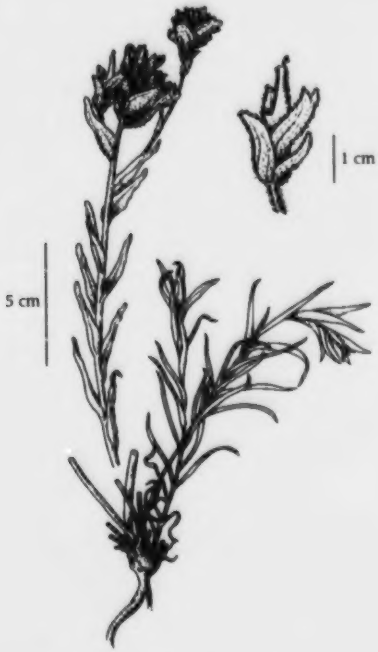
Fruits: Capsules, 9-11 mm long; seeds many, the seed-coats loose, net-veined.



Castilleja rhexifolia



Castilleja rupicola



Castilleja sulphurea

Castilleja tenuis **(Heller) Chuang & Heckard** (*Orthocarpus hispidus* Benth.)

hairy owl-clover

HABITAT/RANGE:

Moist meadows and vernal pools in the lowland, steppe and montane zones; rare on S Vancouver Island and SC BC; S to ID, NV and CA.

DESCRIPTION:

General: Annual herb; stems erect, 10-40 cm tall, slender, simple or with a few erect branches; coarsely spreading-hairy, often glandular above.

Leaves: Alternate, unstalked, 1-4 cm long, coarsely spreading-hairy, the lower leaves linear and entire, the upper ones lanceolate, with 3 to 5 long slender lobes.

Flowers: Inflorescence a dense, compact, prominently bracted, terminal spike 5-20 cm long, the bracts egg-shaped, 10-25 mm long, differing gradually from the leaves, becoming shorter and more deeply cleft into 3 to 7 lanceolate, long-pointy-tipped lobes, green throughout or sometimes tinged with purple; corollas white or yellow, minutely hairy, 12-20 mm long, exserted, tubular, 2-lipped, the upper lip beak-like, straight, 4-5 mm long, the lower lip 3-4 mm long, inflated, 3-pouched, tipped with 3 tiny teeth 0.2-0.8 mm long; calyces tubular, 8-12 mm long, hairy, 2-cleft, each segment 2-toothed, the teeth slender, long-pointy-tipped; stamens 4.

Fruits: Capsules, oblong, 5-9 mm long; seeds several, about 1 mm long, with loose netted coats.

Castilleja thompsonii **Pennell**

Thompson's paintbrush

HABITAT/RANGE:

Dry grasslands, sagebrush shrublands and rocky slopes in the steppe and montane zones; locally frequent in extreme SC BC; S to OR.

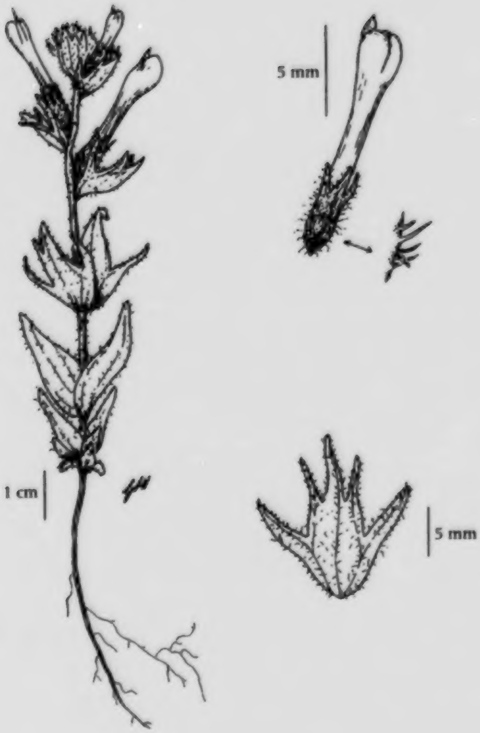
DESCRIPTION:

General: Perennial herb from a somewhat woody stem-base; stems several, clustered, ascending to erect, 10-40 cm tall, frequently branched above, bristly-hairy or long-soft-hairy, sometimes purplish.

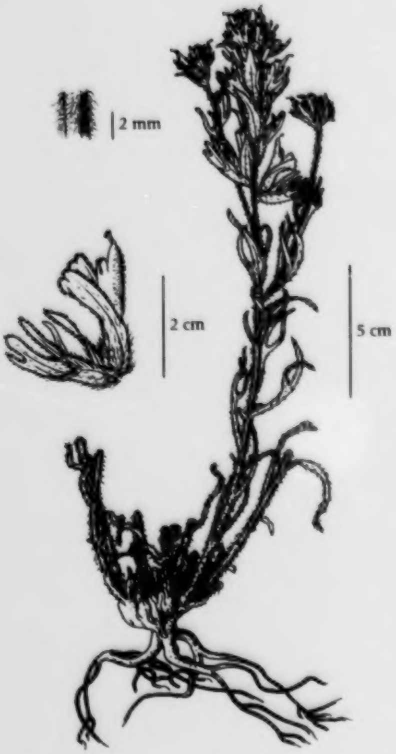
Leaves: Alternate, bristly-hairy or long-soft-hairy, sometimes also glandular, the lower leaves linear and entire, the upper ones with 1 to 2 pairs of linear spreading lobes.

Flowers: Inflorescence a prominently bracted terminal spike, the bracts yellowish, wider than the leaves, deeply 3- to 5-lobed, minutely hairy and also fringed with long hairs; corollas 15-30 mm long, 2-lipped, the upper lip beak-like, included in the calyx or slightly exserted, much shorter than the tube and about 1.5 times the length of the prominent, 3-lobed lower lip; calyces often purplish, hairy, 12-25 mm long, deeply 2-lobed, these primary lobes again divided into 2 triangular or linear segments 1-3 mm long; stamens 4.

Fruits: Capsules; seeds many, the seed-coats loose, net-veined.



Castilleja tenuis



Castilleja thompsonii

***Castilleja unalaschcensis* (Cham. & Schlecht.) Malte**

Unalaska paintbrush; Unalaska Indian-paintbrush

HABITAT/RANGE:

Moist to mesic meadows, thickets and open forests in the lowland, montane and subalpine zones; common in NW BC north of 53° N, including the Queen Charlotte Islands; N to AK and YT.

DESCRIPTION:

General: Perennial herb from a stout, scaly, somewhat woody stem-base; stems several, clustered, ascending to erect, 20-80 cm tall, simple or sometimes branched above, more or less smooth below, hairy above especially in the inflorescence.

Leaves: Alternate, lance-linear to lanceolate, 3-10 cm long, entire, long-tapering to sharp-pointed tip, appressed-rough-hairy to nearly smooth.

Flowers: Inflorescence a prominently bracted terminal spike, the bracts greenish yellow to bright yellow, sometimes tinged with orange, lanceolate to egg- or wedge-shaped, entire and rounded or the upper with 1 to 2 pairs of very short blunt lobes or teeth near the top, hairy; corollas greenish, 15-30 mm long, 2-lipped, the upper lip beak-like, minutely hairy, with yellowish membranous margins, 6-11 mm long, shorter than the tube and 3-4 times the length of the 3-toothed lower lip; calyces greenish to yellow, hairy, 15-23 mm long, 2-lobed to half their length, these primary lobes again divided into 2 blunt or rounded segments; stamens 4.

Fruits: Capsules, 8-12 mm long; seeds many, the seed-coats loose, net-veined.

Notes: Appears to hybridize frequently with *Castilleja miniata*.

CHAENORRHINUM

***Chaenorrhinum minus* (L.) Lange**

common dwarf snapdragon

HABITAT/RANGE:

Mesic to dry roadsides, railway grades and waste places; rare in S BC, also known from Mt. Robson Provincial Park; introduced from Eurasia.

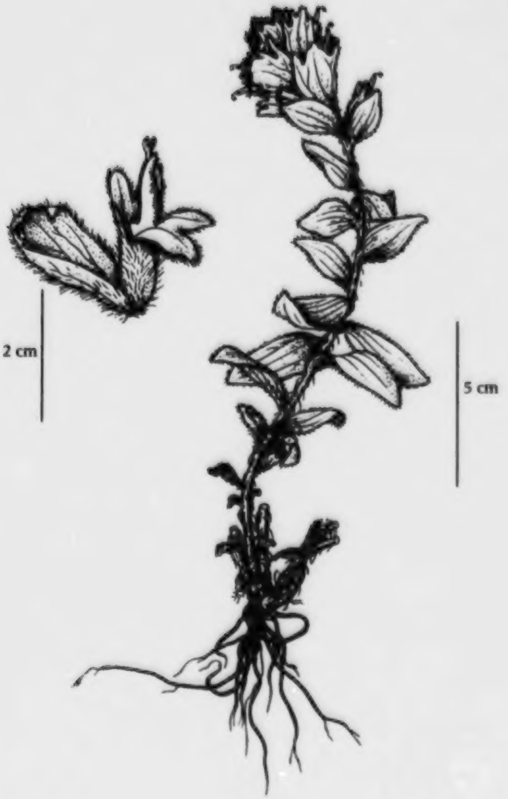
DESCRIPTION:

General: Annual herb from a taproot; stems erect, 5-30 cm tall, slender, usually branched, glandular-hairy.

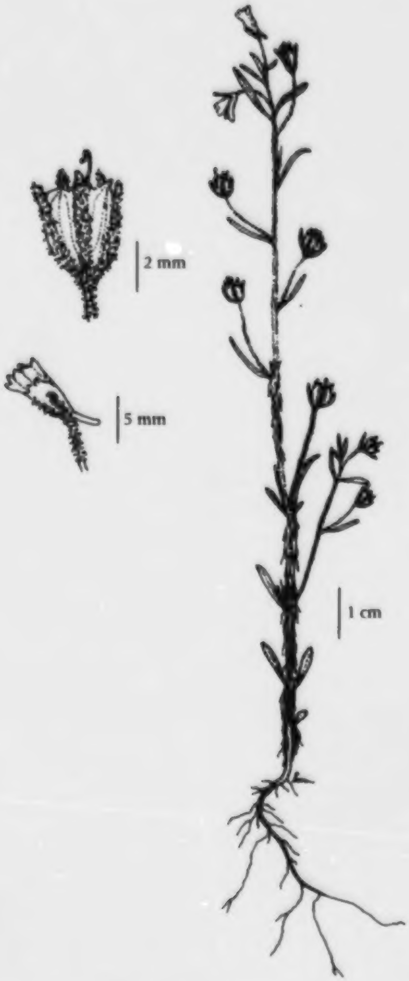
Leaves: Alternate or some of the lower leaves opposite, linear-lanceolate to oblong, 10-25 mm long, entire, blunt-tipped, narrowed to a short stalk-like base, glandular-hairy.

Flowers: Inflorescence an open cluster of single, long-stalked flowers in the axils of leaflike bracts; corollas tubular, 5-8 mm long, bluish-purple with yellow in the throat, 2-lipped, spurred at the base, the blunt spur about 2 mm long; calyces glandular-hairy, deeply 5-lobed, the lobes linear, about 3 mm long; stamens 4.

Fruits: Capsules, nearly globe-shaped, lopsided, about 5 mm long, opening by 2 large pores at the tip, hairy; seeds egg-shaped, longitudinally ridged.



Castilleja unalaschcensis



Chaenorrhinum minus

COLLINSIA[5]

1. Corollas 4-8 mm long, the main lobes about 1 mm wide, the tubes bent at an oblique angle on the calyx; plants widespread .... *C. parviflora*

1. Corollas (7) 9-17 mm long, the main lobes 2-6 mm wide, the tubes bent at nearly a right angle to the calyx; plants occurring in and W of the Coast-Cascade Mountains .... *C. grandiflora*

Collinsia grandiflora **Dougl. *ex* Lindl.**
large-flowered blue-eyed Mary

HABITAT/RANGE:

Vernally moist to dry grassy slopes, mossy rock outcrops and forest edges in the lowland and montane zones; frequent in S BC in and west of the Coast-Cascade Mountains, infrequent N along the coast to 54° N; S to UT and CA.

DESCRIPTION:

General: Annual herb from a taproot; stems erect, 5-40 cm tall, simple or branched, nearly smooth below, glandular-hairy above.

Leaves: Opposite, oblong to lanceolate, 1-4 cm long, minutely toothed to entire, nearly smooth, the lower leaves on 5- to 10 mm-long stalks, the middle and upper leaves unstalked or nearly so, becoming bract-like, smaller and linear in the inflorescence.

Flowers: Inflorescence an open, terminal cluster of short-stalked flowers, (1) 3 to 7 per node, whorled in the axils of leaflike bracts, the stalks smooth to minutely hairy or glandular-hairy; corollas 7-17 mm long, the tube abruptly bent near the base at a right angle to the calyx and short-pouched at the bend, 2-lipped, the upper lip 2-lobed, blue to purple, pale at the centre, the lower lip 3-lobed, deep blue-violet; calyces 4-8 mm long, 5-lobed, the lobes awl-shaped, 2-5 mm long; stamens 4.

Fruits: Capsules, 4-5 mm long; seeds usually 4, round-oblong, smooth, reddish-brown.

Collinsia parviflora **Dougl. *ex* Lindl.**
small-flowered blue-eyed Mary

HABITAT/RANGE:

Vernally moist to dry grassy slopes, mossy rock outcrops, forest glades and open forests in the lowland and montane zones; common throughout BC except NE; N to AK and S YT, E to ON and S to PA, MI, SD, NM, AZ and CA.

DESCRIPTION:

General: Annual herb from a taproot; stems ascending to erect, sometimes sprawling, 5-50 cm tall/long, slender, simple or branched, minutely hairy.

Leaves: Opposite, smooth or minutely hairy, often purplish beneath, the lower leaves egg- to spoon-shaped, on 5- to 10 mm-long stalks, the middle and upper leaves oblong to linear-lanceolate, 1-4 cm long, entire or nearly so, becoming bract-like, smaller, linear and often whorled in the inflorescence.

Flowers: Inflorescence an open, terminal cluster of short-stalked flowers, 1 to 5 per node, whorled in the axils of leaflike bracts, the stalks smooth to finely glandular-hairy; corollas 4-8 mm long, the tube abruptly bent near the base at an oblique angle to the calyx and strongly pouched at the bend, 2-lipped, the upper lip 2-lobed, whitish, the lower lip 3-lobed, blue; calyces 3-6 mm long, 5-lobed, the lobes linear-lanceolate; stamens 4.

Fruits: Capsules, 3-4 mm long; seeds 2 to 4, ellipsoid, smooth, about 2 mm long, with thickened inrolled margins.

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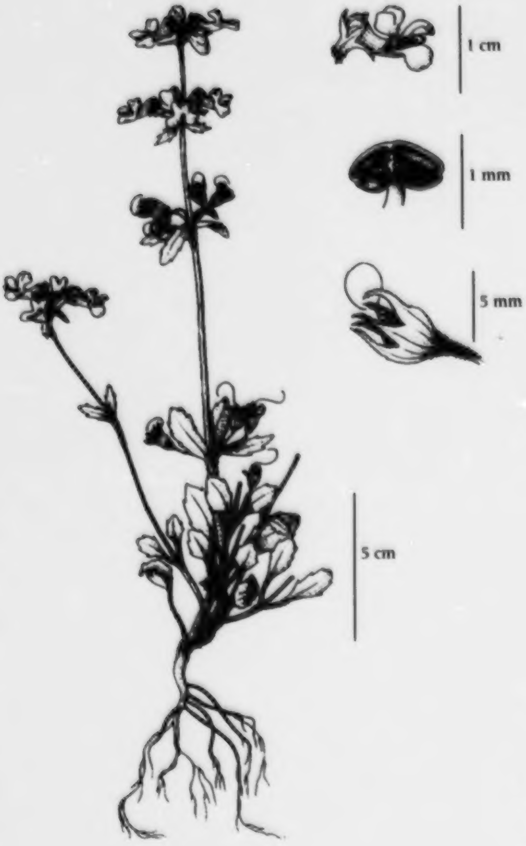
[5] Key adapted from Hitchcock *et al.* (1959).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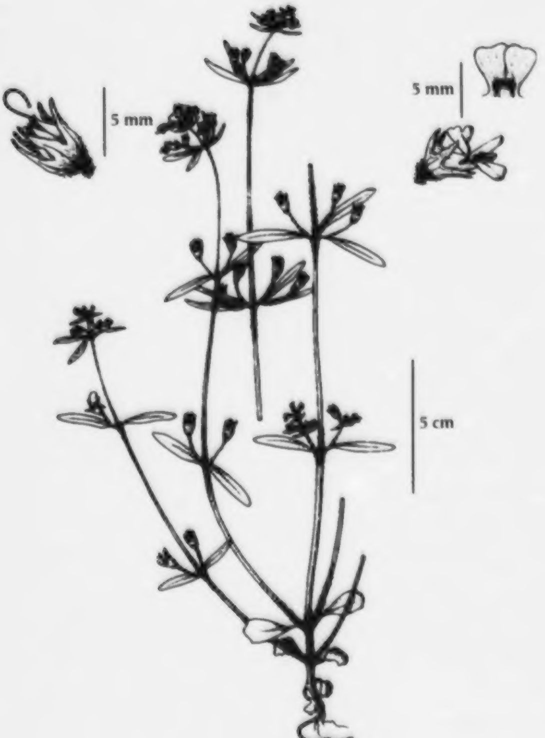
Collinsia grandiflora



Collinsia parviflora

CYMBALARIA

Cymbalaria muralis **Gaertn., Mey. & Scherb.** (*Linaria cymbalaria* [L.] P. Mill.)

ivy-leaved toadflax

HABITAT/RANGE:

Mesic to dry waste places and rocky banks in the lowland zone; infrequent in the Gulf Islands and adjacent lower mainland; introduced from Eurasia.

DESCRIPTION:

General: Annual, biennial, or short-lived perennial herb; stems trailing or climbing, 10-80 cm long, rooting at the nodes, smooth, often purplish.

Leaves: Alternate, long-stalked, ivy-like, about 2.5 cm long, more or less round in outline but palmately and shallowly 3- to 7-lobed, smooth, sometimes purplish beneath, the stalks longer than the blades.

Flowers: Inflorescence of single long-stalked flowers in the axils of leaves, the stalks about 2 cm long; corollas lilac to violet with a yellow patch at the throat, 8-10 mm long, distinctly spurred at the base, the spur curved, 2-3 mm long and blunt-tipped, 2-lipped, the upper lip with 2 erect lobes, the lower lip with 3 spreading lobes; calyces deeply 5-lobed, the lobes linear-lanceolate, about 1/2 as long as the corolla tube; stamens 4.

Fruits: Capsules, globe-shaped, 3-4 mm in diameter, opening by 2 lateral pores; seeds egg-shaped, with thick wavy ridges.

DIGITALIS

Digitalis purpurea **L.**

common foxglove

HABITAT/RANGE:

Moist to mesic roadsides, fields, clearings and forest edges in the lowland zone; common in SW BC, infrequent in the Queen Charlotte Islands; introduced from Europe.

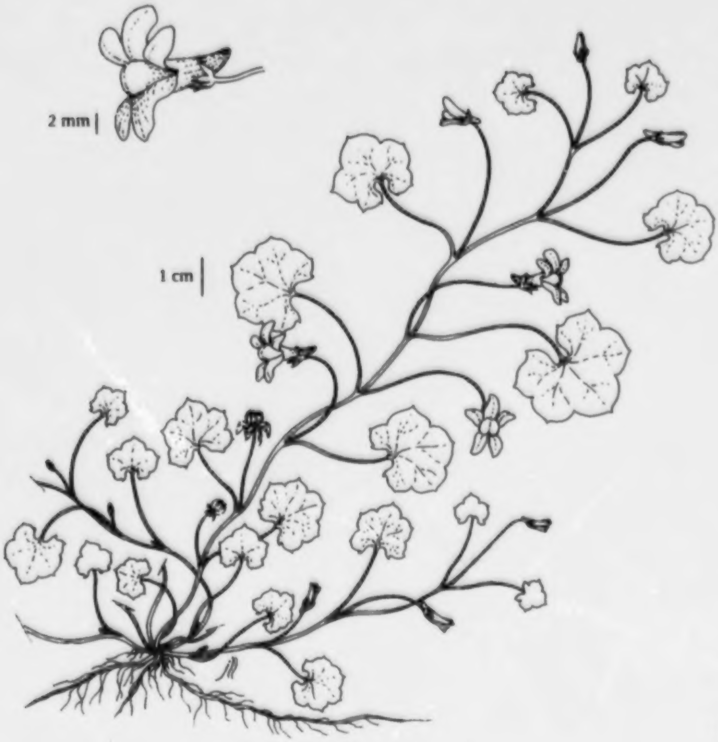
DESCRIPTION:

General: Robust usually biennial herb from fibrous roots; stems erect, 0.5-1.5 m tall, unbranched, densely grey-hairy and becoming glandular upward.

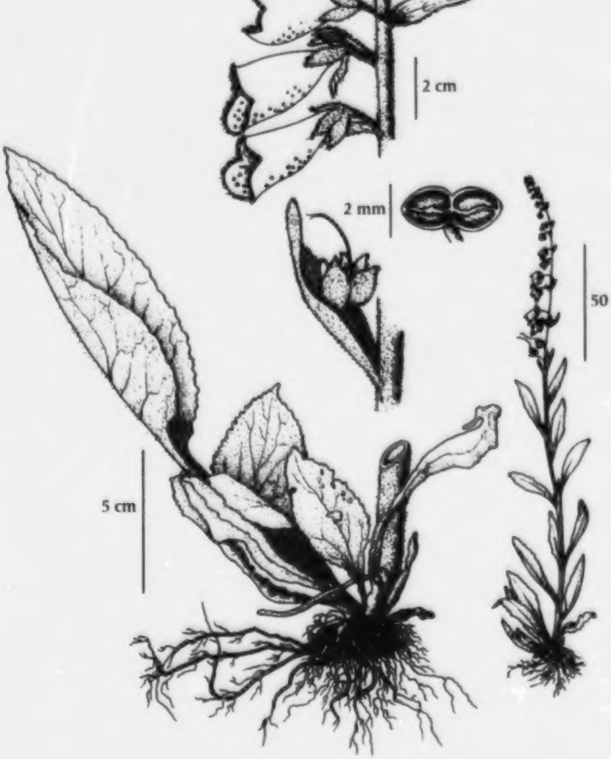
Leaves: Alternate, egg-shaped to lanceolate, 10-40 cm long, coarsely toothed, green and soft-hairy above, grey-woolly beneath, narrowed to the winged stalk, biggest and most numerous at the base in a rosette, reduced upward.

Flowers: Inflorescence a long, narrow, leafy-bracted, 1-sided, terminal raceme of numerous stalked, nodding flowers, the stalks 5-20 mm long; corollas gaping-tubular, 4-6 cm long, weakly 2-lipped, shortly 5-lobed, the lower 3 lobes fused into the longer, more prominent of the 2 lips, pink-purple with deeper purple spots on inside of lower lip, the lips fringed with hairs, sparsely long-hairy in the throat; calyces deeply 5-lobed, the lobes somewhat leaflike, lance-egg-shaped, 1-1.8 cm long; stigmas 2-lobed; stamens 4.

Fruits: Capsules, egg-shaped, about 12 mm long; seeds numerous, small, about 0.5 mm long.



Cymbalaria muralis


2 cm
2 mm
50 cm
5 cm

Digitalis purpurea

EUPHRASIA

1. Teeth of floral bracts blunt to sharp-pointed; leaves usually more or less hairy; infrequent on moist to wet sites in N BC .... *E. subarctica*

1. Teeth of floral bracts awl-shaped or bristle-tipped; leaves usually smooth or nearly so; frequent on relatively dry, disturbed sites in S BC .... *E. nemorosa*

Euphrasia nemorosa **(Pers.) Wallr.** (*E. americana* Wettst., *E. officinalis auct. non* L. or Townsend)

eastern eyebright

HABITAT/RANGE:

Mesic to dry fields, clearings, roadsides and waste places; locally frequent in S BC; introduced from Europe.

DESCRIPTION:

General: Annual herb from a taproot; stems slender, erect, 10-40 cm tall, simple or freely branched, minutely hairy.

Leaves: Opposite, unstalked, few, egg-shaped to nearly circular, 5-15 mm long, palmately veined, prominently 7- to 11-toothed, smooth or sparsely hairy beneath; bracts resembling the leaves but with awl-shaped or bristle-tipped teeth.

Flowers: Inflorescence a terminal spike of single flowers in the axils of leafy bracts; corollas typically pale lavender with purple lines, and a yellow spot on the lower lip, 5-10 mm long, 2-lipped, the upper lip slightly concave with 2 lobes, the lower lip spreading, with 3 notched, oblong lobes; calyces bell-shaped, smooth or nearly so, shorter than the corolla, 4-toothed, the teeth lanceolate, 2-3.5 mm long; stamens 4.

Fruits: Capsules, oblong, flattened, smooth or nearly so; seeds numerous, 1-2 mm long, narrowly winged.

Euphrasia subarctica **Raup** (*Euphrasia arctica auct. non* Lange *ex* Rostrup var. *disjuncta* [Fern. & Wieg.] Cronq., *E. disjuncta auct. non* Fern. & Wieg.)

arctic eyebright

HABITAT/RANGE:

Moist to wet streambanks, shores, bogs, gravelly openings in thickets, and heath in the montane and subalpine zones; infrequent in BC in and east of the Coast-Cascade Mountains and north of 52° N; N to AK, YT and NT, E to NF and S to MT; Greenland.

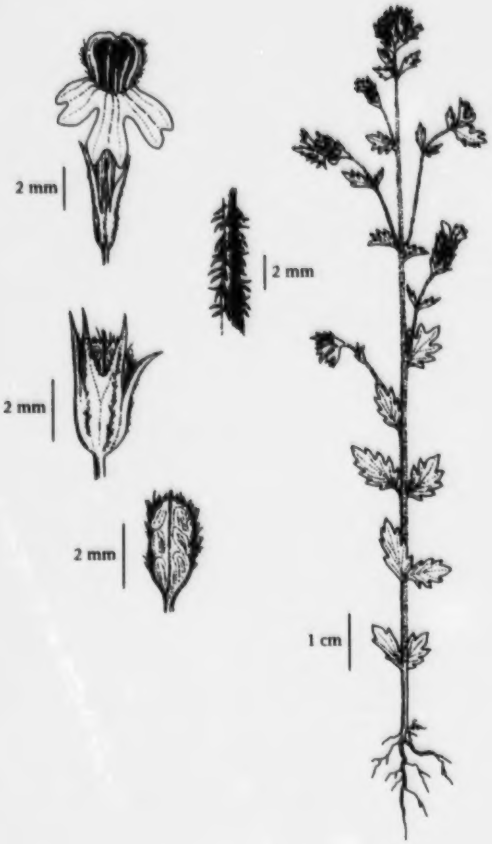
DESCRIPTION:

General: Annual herb from a taproot; stems slender, erect, 3-30 cm tall, simple or branched from below the middle, minutely hairy and sometimes glandular-hairy above.

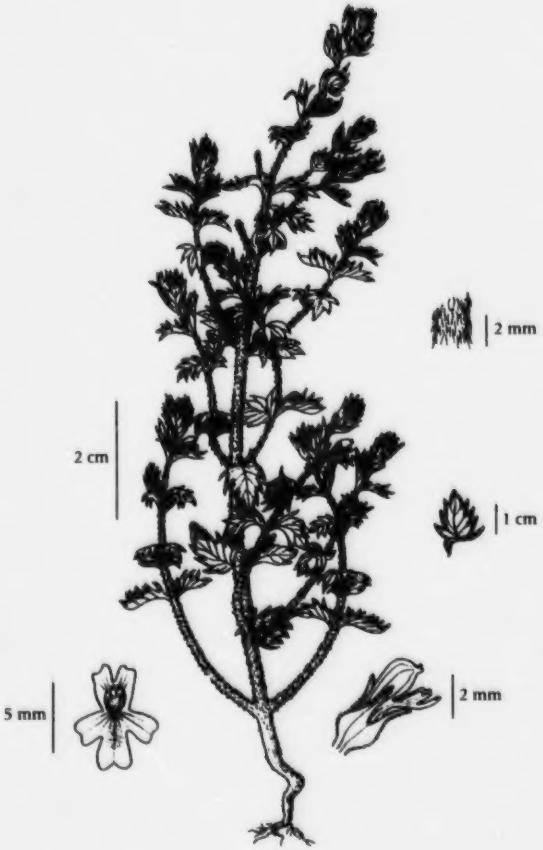
Leaves: Opposite, unstalked, few, egg-shaped to circular, 2-18 mm long, palmately veined, prominently 7- to 11-toothed, sparsely hairy; bracts resembling the leaves but with more pointed teeth.

Flowers: Inflorescence a terminal spike of single small flowers in the axils of leafy bracts; corollas whitish with purple markings and a yellow eye, about 5 mm long, 2-lipped, the upper lip slightly concave with 2 lobes, the lower lip spreading, with 3 shallowly notched, oblong lobes; calyces bell-shaped, hairy or glandular-hairy, almost as long as the corolla, 4-toothed, the teeth triangular or lanceolate; stamens 4.

Fruits: Capsules, oblong, flattened, 3-6 mm long, more or less hairy; seeds numerous, narrowly winged.


2 mm
2 mm
2 mm
2 mm
1 cm

Euphrasia nemorosa


2 mm
2 cm
1 cm
5 mm
2 mm

Euphrasia subarctica

GRATIOLA

1. Flower stalks lacking bractlets below the calyx, the sepals evidently 5; plants smooth to obscurely glandular above .... *G. ebracteata*

1. Flower stalks bearing a pair of bractlets below the calyx, the sepals thus apparently 7; plants more or less glandular-sticky .... *G. neglecta*

Gratiola ebracteata **Benth.** ***ex*** **A. DC.**

bractless hedge-hyssop

HABITAT/RANGE:

Wet open muddy shores, streambanks and vernal pools in the lowland zone; locally frequent in SW BC; S to W MT, ID and CA.

DESCRIPTION:

General: Annual herb from fibrous roots; stems erect to decumbent, 5-20 cm tall, simple or few-branched, smooth to obscurely and minutely glandular-hairy above.

Leaves: Opposite, unstalked, lanceolate, 8-25 mm long, sparingly and minutely toothed toward the tip or entire, gradually long-tapering to the pointed tip, smooth.

Flowers: Inflorescence of single small flowers on stalks in the axils of reduced upper leaves, the stalks stout, 1-2 cm long, without bractlets at the top; corollas tubular, 5-8 mm long, 2-lipped, the upper lip shallowly 2-lobed, the lower lip 3-lobed, the tube yellow, the lobes white sometimes pink-tinged; calyces 4-7 mm long, to 10 mm in fruit, the 5 distinct sepals more or less equal, lanceolate, long-pointed at the tip; fertile stamens 2.

Fruits: Capsules, egg- to globe-shaped, 4-5 mm long; seeds numerous, oblong-egg-shaped, longitudinally ribbed with faint cross ridges.

Gratiola neglecta **Torr.**

American hedge-hyssop

HABITAT/RANGE:

Wet open muddy edges of lakes, ponds and streams and in shallow water in the lowland, steppe and lower montane zones; infrequent in SW BC, rare elsewhere in S BC; E to PQ and NS and S to ME, NY, PA, SC, AL, LA, TX, NM, AZ and CA.

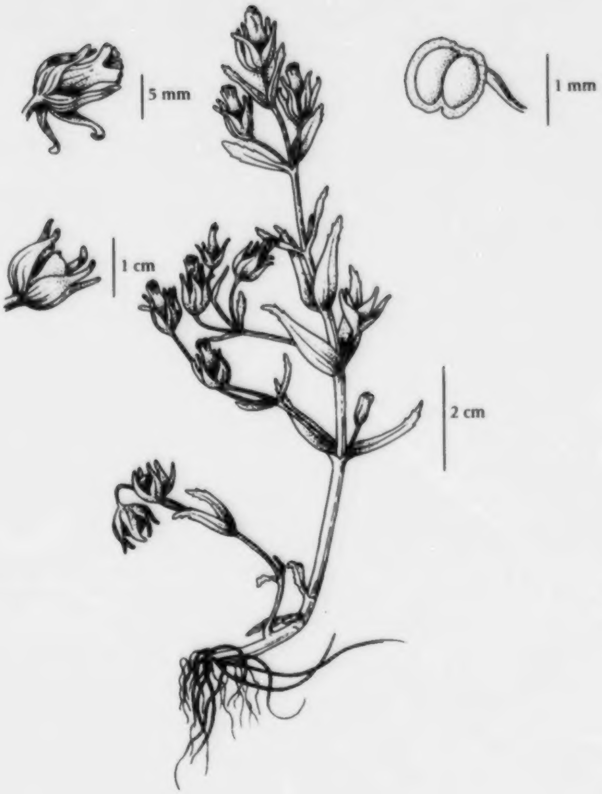
DESCRIPTION:

General: Annual herb from fibrous roots; stems ascending to decumbent, 5-30 cm tall, simple or branched, finely glandular-hairy and clammy especially upward.

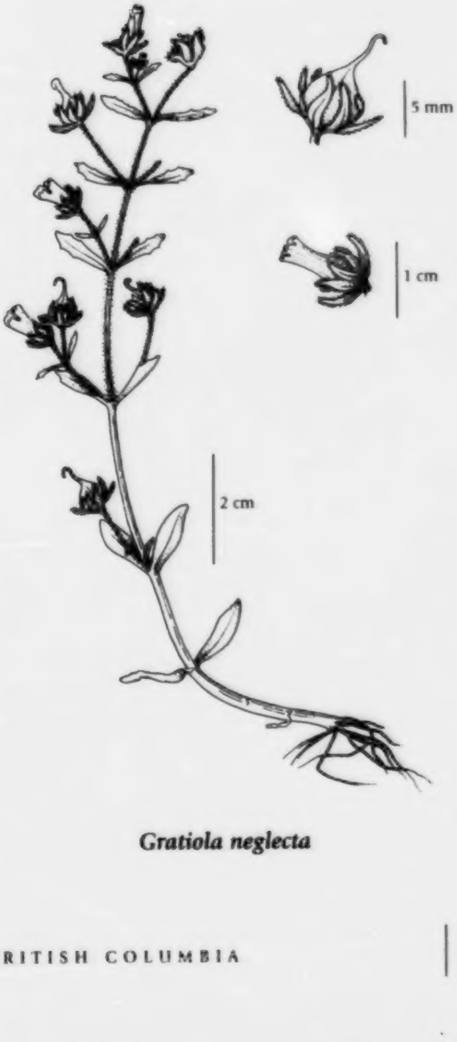
Leaves: Opposite, unstalked, lanceolate to narrowly egg-shaped, 10-40 mm long, entire or remotely toothed toward the tip, short-tapering to the pointed or blunt tip.

Flowers: Inflorescence of single small flowers on stalks in the axils of reduced upper leaves, the stalks slender, glandular-hairy, 1-2 cm long, with 2 bractlets at the top; corollas tubular, 7-10 mm long, 2-lipped, the upper lip merely shallowly notched, the lower lip 3-lobed, the tube yellow, the lobes white to lavender; calyces 3-7 mm long, the 5 nearly distinct sepals more or less equal, lanceolate, pointed at the tip but not sharply so, accompanied by the 2 bractlets, which are about the same size and shape as the sepals; fertile stamens 2.

Fruits: Capsules, broadly egg-shaped, pointed, 4-7 mm long; seeds numerous, short-cylindric, net-veined.


5 mm
1 mm
1 cm
2 cm

Gratiola ebracteata



Gratiola neglecta

KICKXIA

Kickxia elatine **(L.) Dumort.**

sharp-leaved fluellen

HABITAT/RANGE:

Mesic to moist, sandy roadsides and waste places; rare on S Vancouver Island and the lower mainland; introduced from Europe.

DESCRIPTION:

General: Annual herb; stems prostrate, 20-60 cm long, slender, freely branched from near the base, long-hairy and also somewhat glandular-hairy.

Leaves: Alternate except the few lowest opposite, stalked, the stalks 1-5 mm long, the lowest leaves oval and coarse-toothed, the upper and middle leaves arrowhead-shaped with basal flanges, 1-3 cm long, long-hairy.

Flowers: Inflorescence of single long-stalked flowers in the axils of leaflike bracts, the stalks thread-like, smooth, bent downward, 1-3 cm long; corollas bilaterally symmetric, pale yellow with purple upper lip, 6-10 mm long, 2-lipped, with a straight spur at the base; calyces deeply 5-lobed, the lobes narrowly egg-shaped, long-hairy; stamens 4.

Fruits: Capsules, globe-shaped, smooth, opening near the top by 2 large pores with deciduous lids; seeds honeycombed.

LIMOSELLA

Limosella aquatica **L.**

water mudwort

HABITAT/RANGE:

Wet muddy shores of lakes, ponds and streams, and shallow water in the lowland, steppe and montane zones; infrequent throughout BC south of 57° N, absent from the Queen Charlotte Islands; circumpolar, N to AK, YT and NT, E to Labr. and S to MN, NE, NM, AZ and CA; Iceland, Eurasia.

DESCRIPTION:

General: Small annual or perennial herb, 2-10 cm tall, from fibrous roots, usually with stolons rooting at the nodes and forming secondary plantlets, often submerged.

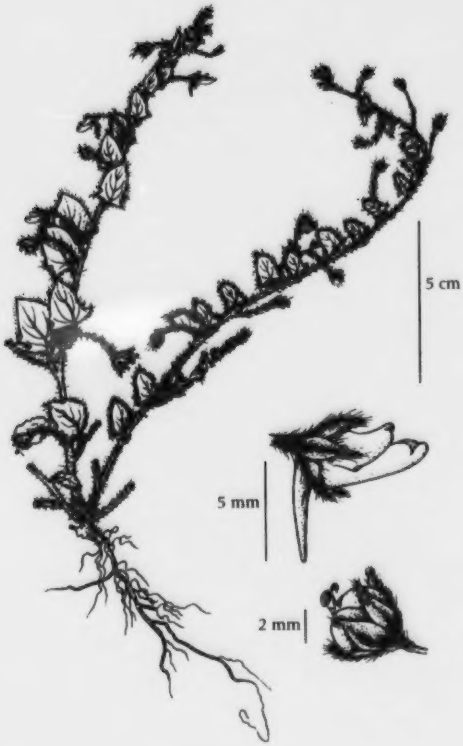
Leaves: All basal in a tuft, long-stalked, the blades oblong to narrowly elliptic, 1-3 cm long, narrowing to slender stalks 1-8 cm long, entire, smooth.

Flowers: Inflorescence of several to many, solitary flowers atop 8- to 30-mm long, naked stalks arising from the axils of the tufted leaves; corollas white or pinkish, with a bell-shaped, 2-mm long tube spreading to 5 lance-oblong lobes about 1 mm long; calyces green with purplish spots, bell-shaped, 2-3 mm long, 5-lobed, the lobes broadly triangular, shorter than the tube; stamens 4.

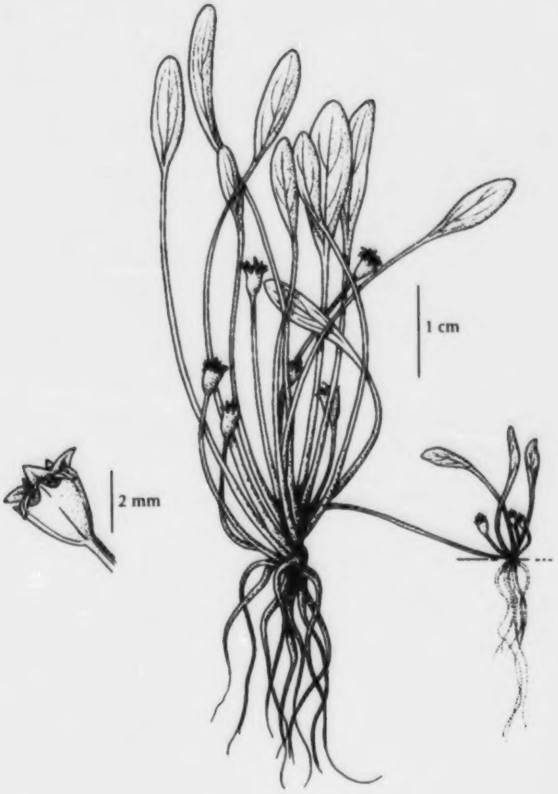
Fruits: Capsules, broadly egg-shaped, 2-3.5 mm long, the fruiting stalks spreading; seeds numerous, finely cross-corrugated.

LINARIA

1. Corollas yellow.
    2. Leaves linear, 1-5 mm wide, not clasping at the base .... *L. vulgaris*
    2. Leaves egg- or lance-egg-shaped, 10-20 mm wide, clasping at the base .... *L. genistifolia*
1. Corollas blue, violet or purple.
    3. Plants perennials, smooth and glaucous in the inflorescence .... *L. purpurea*
    3. Plants annuals or biennials, more or less sticky or glandular in the inflorescence .... *L. canadensis*



Kickxia elatine



Limosella aquatica

***Linaria canadensis* (L.) Dum.-Cours. var. *texana* (Scheele) Pennell**

blue toadflax

HABITAT/RANGE:

Moist, open, sandy sites in the lowland zone; infrequent on S Vancouver Island, the Gulf Islands and adjacent mainland; E to SK and S to NC, FL, MS, TX, NM, AZ, CA and MX.

DESCRIPTION:

General: Annual herb from a taproot; flowering stems erect, 10-50 cm tall, smooth, glaucous, usually also with a rosette of short prostrate stems with ascending tips; milky juice appearing when stems or leaves broken.

Leaves: Leaves of the short prostrate shoots opposite or in 3's, shorter and broader than those of the erect stems, which are alternate, numerous, unstalked, linear, smooth-margined, 1-3 cm long, and smooth.

Flowers: Inflorescence a terminal, smooth to minutely glandular-hairy, spike-like cluster of several to many short-stalked flowers, at first crowded, elongating in age; corollas pale blue with a lighter patch at the throat, 10-13 mm long excluding the curved, 5- to 10-mm long, basal spur, 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed; calyces about 3 mm long, deeply 5-lobed, the lobes nearly distinct, broadly lanceolate; stamens 4.

Fruits: Capsules, ellipsoid to nearly globe-shaped, 2.5-4 mm long; seeds numerous, angular, 0.3-0.5 mm long, with tiny bumps.

Notes: Variety *canadensis* (introduced from eastern N America), with smaller flowers (corollas 8-10 mm long) and smooth seeds, has been collected once near Vancouver but does not persist.

***Linaria genistifolia* (L.) P. Miller ssp. *dalmatica* (L.) Maire & Petitmengin** (*L. dalmatica* [L.] P. Miller)

Dalmatian toadflax

HABITAT/RANGE:

Roadsides and waste places; common in BC south of 55° N, except absent from the Queen Charlotte Islands; introduced from Europe.

DESCRIPTION:

General: Perennial herb from a long creeping rhizome; stems erect, 40-120 cm tall, branched above, smooth, glaucous; milky juice appearing when stems or leaves broken.

Leaves: Alternate, numerous, unstalked, clasping the stem at the base, egg-shaped to broadly lanceolate, smooth-margined, 2-6 cm long, smooth, glaucous.

Flowers: Inflorescence a long, terminal, spike-like cluster of numerous short-stalked flowers; corollas bright yellow with a central, orange- to white-hairy patch at the throat, 25-40 mm long including the long straight basal spur, which is shorter than the rest of the corolla, 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed; calyces 5-8 mm long, deeply 5-lobed, the lobes nearly distinct, broadly lanceolate; stamens 4.

Fruits: Capsules, cylindric-egg-shaped to nearly globe-shaped, 6-8 mm long; seeds numerous, wrinkled and slightly wing-angled, 1-2 mm long.

***Linaria purpurea* (L.) P. Miller**

purple toadflax

HABITAT/RANGE:

Mesic to dry roadsides and waste places; infrequent garden-escape in S BC; introduced from Europe.

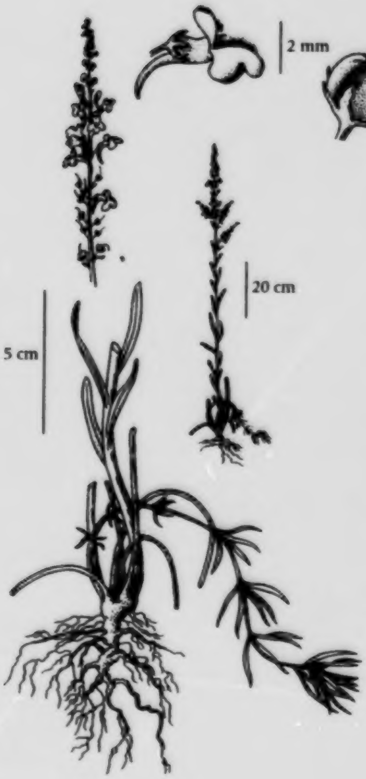
DESCRIPTION:

General: Perennial herb from a taproot; stems erect, 40-100 cm tall, branched above, smooth, glaucous; milky juice appearing when stems or leaves broken.

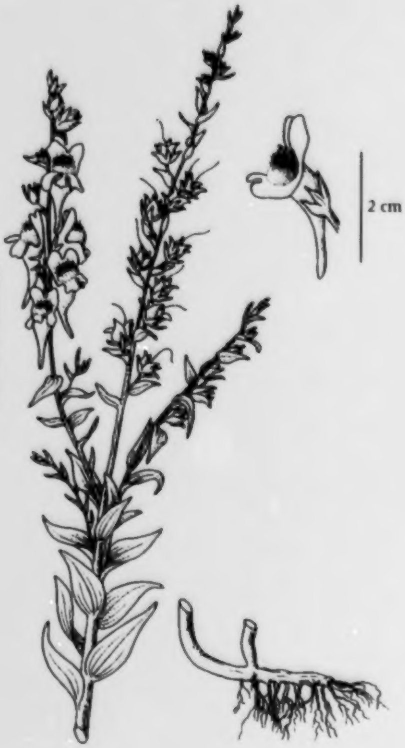
Leaves: Whorled, numerous, unstalked, linear to narrowly lanceolate, smooth-margined, 1-5 cm long, smooth.

Flowers: Inflorescence of long, terminal, spike-like clusters of numerous short-stalked flowers, at first dense, elongating in age; corollas violet, rarely pink, with a white-hairy patch at the throat, about 8 mm long excluding the curved basal spur, which is more than _ as long as the rest of the corolla, 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed; calyces deeply 5-lobed, the lobes nearly distinct, linear; stamens 4.

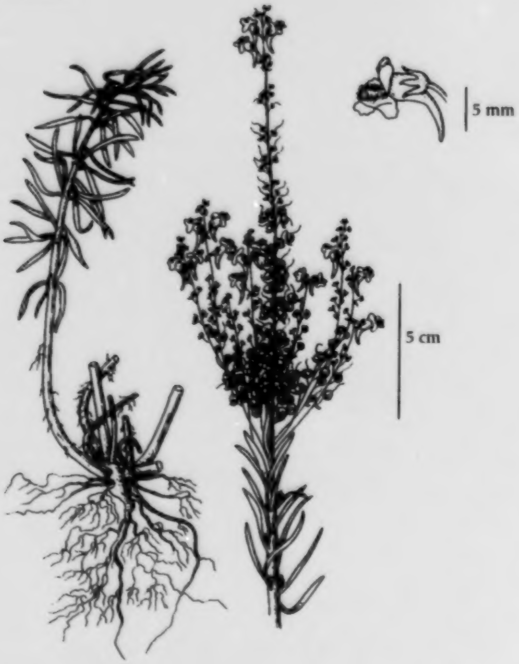
Fruits: Capsules, egg- to nearly globe-shaped; seeds numerous, angled, wingless, net-veined.


2 mm
5 mm
20 cm
5 cm

Linaria canadensis var. *texana*



Linaria genistifolia ssp. *dalmatica*



Linaria purpurea

***Linaria vulgaris* P. Miller**

butter-and-eggs; common toadflax

HABITAT/RANGE:

Moist to dry fields, roadsides, waste places and open forests; frequent in BC south of 57° N, except absent from the Queen Charlotte Islands, rare northward; introduced from Eurasia.

DESCRIPTION:

General: Perennial herb from a long creeping rhizome; stems erect, 10-80 cm tall, sometimes branched above, smooth, glaucous; milky juice appearing when stems or leaves broken.

Leaves: Alternate or the lowermost nearly opposite, numerous, unstalked, linear to narrowly lanceolate, smooth-margined, 2-10 cm long, smooth.

Flowers: Inflorescence a long, terminal, smooth to minutely glandular-hairy, spike-like cluster of numerous short-stalked flowers, at first dense, elongating in age; corollas bright yellow with a central, orange-hairy patch at the throat, 20-35 mm long including the long straight basal spur, which is about as long as the rest of the corolla, 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed; calyces 2-4 mm long, deeply 5-lobed, the lobes nearly distinct, lanceolate; stamens 4.

Fruits: Capsules, egg-shaped to broadly cylindric, 5-10 mm long; seeds numerous, disc-shaped with broad wings, about 2 mm long, the central portion pimply.

LINDERNIA

***Lindernia dubia* (L.) Pennell var. *anagallidea* (Michx.) Cooperr.** (*L. anagallidea* [Michx.] Pennell)

false-pimpernel

HABITAT/RANGE:

Wet, sandy or muddy banks and shores in the lowland and steppe zones; rare in SC BC and the lower Fraser Valley; disjunct E to ON and S to NH, NY, SC, FL, MS, TX, UT, AZ, CA and MX; S. America.

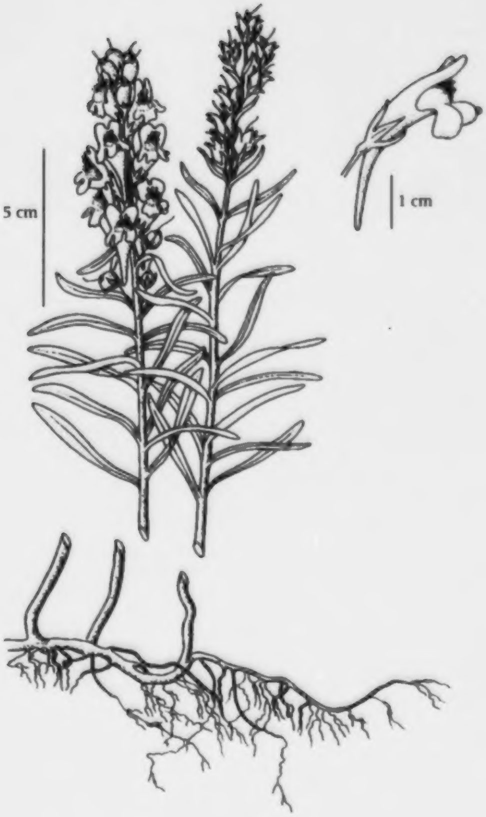
DESCRIPTION:

General: Low annual herb from fibrous roots; stems ascending to erect, 5-20 cm tall, slender, branched, smooth.

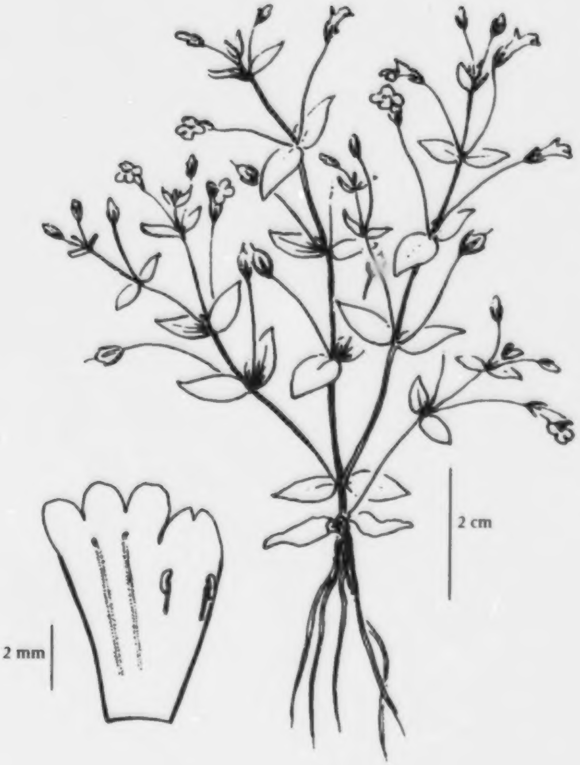
Leaves: Opposite, unstalked, egg-shaped to elliptic, 0.5-2 cm long, entire to obscurely few-toothed, 3- to 5-veined, smooth.

Flowers: Inflorescence of single stalked flowers in the leaf axils, the thread-like stalks longer than the leaves; corollas blue-violet to whitish, narrowly bell-shaped, 6-9 mm long, 2-lipped, the upper lip with 2 short teeth, the lower lip longer, projecting, 3-lobed, the throat with 2 yellow-hairy ridges; calyces of 5 nearly distinct, equal, linear segments, 3-4 mm long; fertile stamens 2.

Fruits: Capsules, ellipsoid, 4-6 mm long; seeds numerous, yellowish, 0.2-0.4 mm long, smooth to finely net-veined.



Linaria vulgaris



Lindernia dubia **var.** ***anagallidea***

MELAMPYRUM

Melampyrum lineare **Desr. var.** ***lineare***

cow-wheat

HABITAT/RANGE:

Dry to mesic grassy openings, sandy or gravelly terraces, rocky slopes and open forests in the lowland and montane zones; locally frequent in BC south of 57° N, except absent on the Queen Charlotte Islands; E to NF and S to ME, PA, SC, TN, WI, MN, MT, ID and WA.

DESCRIPTION:

General: Annual herb; stems slender, ascending to erect, 10-40 cm tall, simple or commonly with a few branches, nearly smooth to minutely hairy or glandular, especially above.

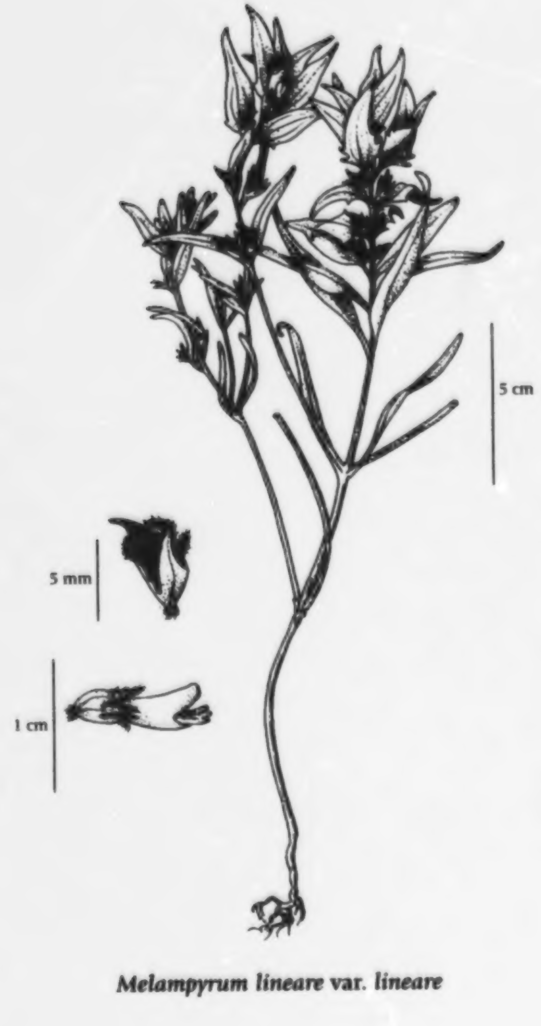
Leaves: Opposite, short-stalked, lanceolate to linear, mostly entire, the uppermost leaves often toothed near the base, 2-5 cm long, smooth or glandular.

Flowers: Inflorescence a leafy-bracted terminal spike, or of solitary, short-stalked flowers in the upper leaf axils; corollas white to straw-coloured or pinkish, tubular with a yellow patch in the throat, 5-12 mm long, 2-lipped, the upper lip hood-like, the lower lip 3-lobed; calyces cup-shaped, deeply 4-lobed, the lobes awl-shaped; stamens 4.

Fruits: Capsules, curved, asymmetrically egg-shaped, flattened, 8-10 mm long; seeds 1 to 4, 2-4 mm long, blackish with light-coloured tips when mature.

MIMULUS

1. Corollas reddish to light purple or pink-purple.
    2. Stems less than 15 cm tall; leaves 1-2 cm long; corollas red to magenta to light purple; plants rare in SC BC .... *M. breweri*
    2. Stems more than 30 cm tall; leaves 3-7 cm long; corollas pink-purple to rose-red; plants frequent in S BC .... *M. lewisii*
1. Corollas yellow, often with reddish, purplish or brownish markings.
    3. Plants perennials from rhizomes or stolons.
        4. Upper calyx tooth larger than the others.
            5. Plants with rhizomes and often with stolons as well; flowers mainly 1 to 3, the corollas 2-4 cm long .... *M. tilingii*
            5. Plants with stolons, rarely also with rhizomes; flowers usually 5 or more; the corollas sometimes less than 2 cm long .... *M. guttatus*
        4. Upper calyx tooth not evidently larger than the others.
            6. Plants somewhat hairy, scarcely sticky; calyx tubes long-hairy along the 5 ribs; plants rare on S Vancouver Island .... *M. dentatus*
            6. Plants sticky-hairy, somewhat slimy; calyx tubes sticky-long-hairy all over; plants widespread in S BC .... *M. moschatus*
    3. Plants annuals, lacking rhizomes or stolons.
        7. Corollas strongly 2-lipped, the lower lip evidently longer.
            8. Calyx teeth dissimilar in size, the upper one the largest; plants widespread .... *M. guttatus*
            8. Calyx teeth similar in size; plants of SW BC .... *M. alsinoides*
        7. Corollas slightly 2-lipped, the lower lip only slightly longer than the upper.
            9. Corollas 6-15 mm long; stems white-long-hairy, more or less slimy; leaves abruptly contracted to the stalks .... *M. floribundus*
            9. Corollas 4-7 mm long; stems minutely glandular-hairy; leaves usually tapering to the short-stalked or occasionally unstalked bases .... *M. breviflorus*



Melampyrum lineare var. *lineare*

***Mimulus alsinoides* Dougl. *ex* Benth.**

chickweed monkey-flower

HABITAT/RANGE:

Vernally moist, mossy cliffs, crevices and ledges in the lowland and lower montane zones; infrequent on S Vancouver Island, the Gulf Islands and lower Fraser River drainage; S to ID and N CA.

DESCRIPTION:

General: Small annual herb from a taproot; stems decumbent to erect, 5-25 cm tall, simple or more often freely branched, nearly smooth to minutely hairy.

Leaves: Opposite, stalked, broadly egg- to diamond-shaped, 1-4 cm long, irregularly toothed, yellowish-green, smooth, obscurely 3- to 5-veined from the base; the stalks at least as long as the blades.

Flowers: Inflorescence of few to several long-stalked flowers in the axils of the leaves, the stalks slender, 7-25 mm long, usually longer than the subtending leaves, spreading to ascending; corollas tubular funnel-shaped, 7-14 mm long, yellow with a large reddish blotch within at the base of the lower lip, smooth, 2-lipped, the upper lip with 2 erect lobes, the lower lip 3-lobed, the middle lobe spreading to deflexed and nearly twice as long as the lateral lobes; calyces 4-7 mm long, smooth or minutely hairy, 5-toothed, the 2 lower teeth rounded and longer than the 3 tiny, sharply triangular, upper teeth; stamens 4, smooth.

Fruits: Capsules, oblong, pointy-tipped, 5-7 mm long; seeds numerous.

***Mimulus breviflorus* Piper**

short-flowered monkey-flower

HABITAT/RANGE:

Moist to mesic open areas in the steppe and lower montane zones; infrequent in SC and SE BC; S to WY, ID and N CA.

DESCRIPTION:

General: Small annual herb from a taproot, minutely glandular-hairy throughout; stems erect, 5-18 cm tall, simple or usually freely branched.

Leaves: Opposite, short-stalked or sometimes unstalked, elliptic or diamond-shaped to broadly lanceolate, 0.5-2 cm long, entire or wavy-toothed, 3-veined from the base.

Flowers: Inflorescence of few to several stalked flowers in the axils of the leaves, the stalks slender, 3-15 mm long, ascending in fruit; corollas tubular funnel-shaped, 4-7 mm long, pale yellow, spotted, hairy at the throat within, scarcely 2-lipped, the 5 lobes subequal, spreading, blunt to rounded; calyces tubular bell-shaped, 3-6 mm long in flower, to 7 mm and somewhat swollen in fruit, smooth to glandular-hairy, 5-toothed, the teeth triangular, more or less equal, and fringed with hairs; stamens 4, smooth.

Fruits: Capsules, narrowly egg-shaped, pointy-tipped, 3-6 mm long; seeds numerous, 0.3-0.4 mm long.

***Mimulus breweri* (Greene) Coville**

Brewer's monkey-flower

HABITAT/RANGE:

Moist to mesic open areas near seepage or streams and rocky slopes in the lower montane zone; rare in S BC; S to CO, UT, NV and CA.

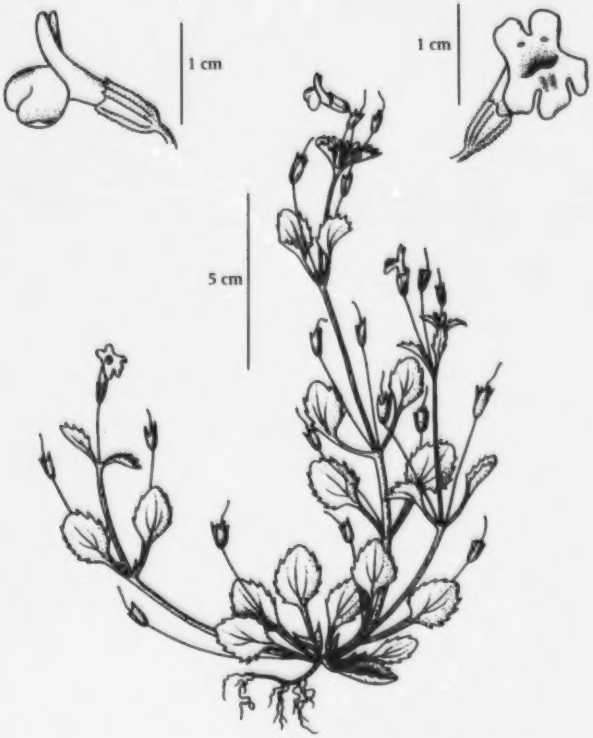
DESCRIPTION:

General: Small annual herb from a taproot, minutely glandular-hairy throughout; stems erect, 2-15 cm tall, simple or more often freely branched.

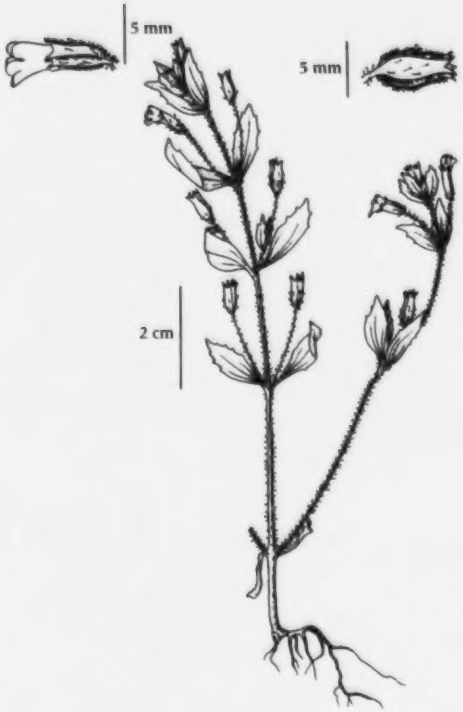
Leaves: Opposite, more or less unstalked, oblong to linear, 1-2 cm long, entire, blunt-tipped, obscurely 1- to 3-veined.

Flowers: Inflorescence of several to many stalked flowers in the axils of the leaves, the stalks slender, 3-10 mm long; corollas tubular funnel-shaped, 5-8 mm long, pale pink to magenta or red, smooth on the outside, weakly 2-lipped, the 5 lobes subequal, spreading, with scattered hairs and yellow spots at the throat within, sometimes also with scattered red spots; calyces cylindric, 4-7 mm long, often reddish or red-spotted, 5-toothed, the teeth triangular and more or less equal; stamens 4, smooth.

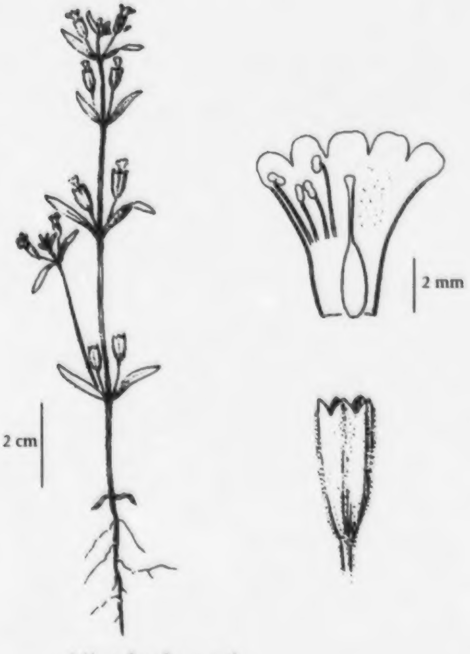
Fruits: Capsules, oblong, pointy-tipped, 4-7 mm long; seeds numerous, about 0.4 mm long.



Mimulus alsinoides



Mimulus breviflorus



Mimulus breweri

Mimulus dentatus **Nutt. *ex* Benth.**

tooth-leaved monkey-flower

HABITAT/RANGE:

Moist forests and streambanks in the lowland and lower montane zones; rare on S Vancouver Island; S to N CA.

DESCRIPTION:

General: Perennial herb from a well-developed, shallow rhizome, more or less white-hairy but not sticky-slimy throughout; stems ascending, 10-40 cm tall.

Leaves: Opposite, egg-shaped, short-stalked becoming nearly unstalked upward, 1-7 cm long, coarse-toothed, pinnately veined, reduced in the inflorescence.

Flowers: Inflorescence a loose, terminal raceme of few to several, long-stalked flowers in the axils of the upper leaves, the stalks 2-5 cm long; corollas tubular, funnel-shaped, yellow often with red dots in the flaring throat, 2.5-4 cm long, strongly 2-lipped; calyces spreading-hairy on the ribs, 8-17 mm long, more or less equally 5-toothed, the teeth fringed with long hairs; stamens 4.

Fruits: Capsules, 8-9 mm long; seeds numerous.

Mimulus floribundus **Lindl.**

purple-stemmed monkey-flower

HABITAT/RANGE:

Moist streambanks, meadows and seepage sites in the steppe and lower montane zones; infrequent in SC BC, rare in SE BC; E to AB and S to NM, AZ and CA.

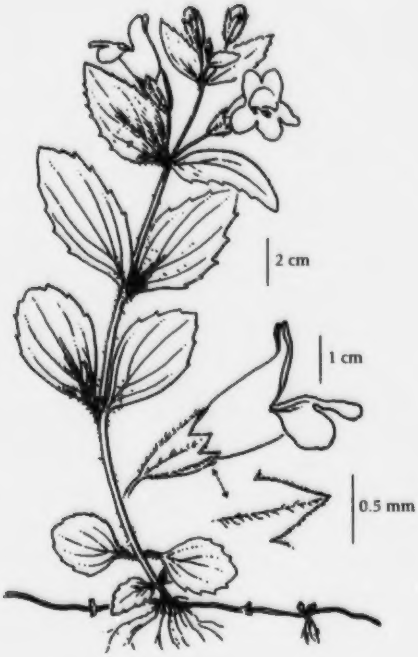
DESCRIPTION:

General: Annual herb from a taproot, glandular-long-hairy and somewhat slimy throughout; stems decumbent to erect, 5-40 cm long/tall, simple or more often branched from near the base.

Leaves: Opposite, stalked, triangular egg-shaped to broadly lanceolate, 1-5 cm long, coarse-toothed, 3- to 5-veined from the base, the margins fringed with long hairs.

Flowers: Inflorescence of few to several long-stalked flowers in the axils of the leaves, the stalks slender, 5-15 mm long, spreading in fruit; corollas tubular funnel-shaped, 6-15 mm long, yellow, spotted with red, hairy at the throat within, scarcely 2-lipped, 5-lobed, the 2 lobes of the upper lip slightly longer, mostly erect, blunt to rounded; calyces cylindric, 4-8 mm long, to 10 mm in fruit, glandular-hairy at least on the ribs, 5-toothed, the teeth lanceolate, more or less equal; stamens 4, smooth.

Fruits: Capsules, elliptic to egg-shaped, pointy-tipped, 3.5-5 mm long, included in the inflated calyces; seeds numerous, 0.3-0.4 mm long.


2 cm
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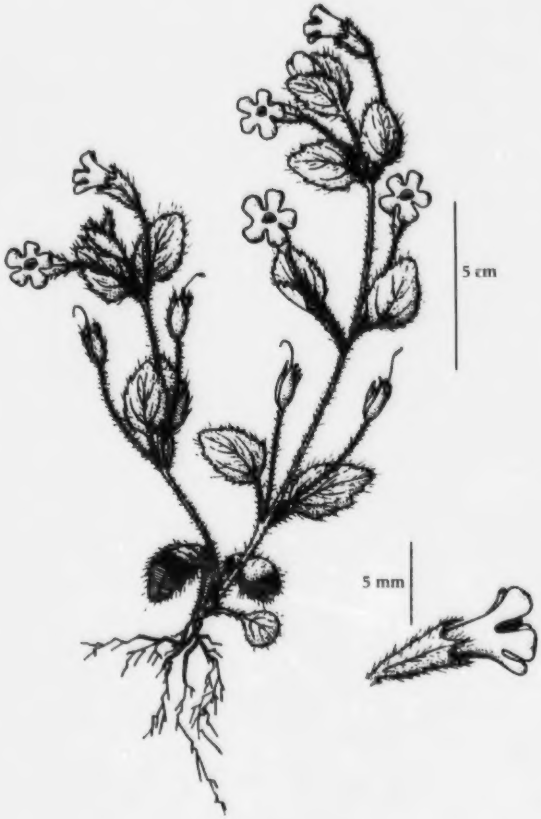
0.5 mm

Mimulus dentatus



Mimulus floribundus

Mimulus guttatus **DC.** (*M. guttatus* ssp. ***haidensis*** Calder & Taylor)

yellow monkey-flower

HABITAT/RANGE:

Wet open sites, including seepage areas, meadows, waterfall spray zones, streambanks, springs, gravel bars, rock ledges and crevices, ditches and clearings in the lowland, steppe, montane and subalpine zones; common throughout BC; N to AK and S YT, E to SK, disjunct to NB and NFand S to PA, MI, NE, NM, AZ, CA and MX.

DESCRIPTION:

General: Annual herb from fibrous roots or a perennial from a creeping stolon, rarely from a rhizome; stems stout and erect or sometimes weak and trailing and rooting at the nodes, 5-80 cm tall, simple or branched, smooth or sparsely hairy above.

Leaves: Opposite, broadly oval to egg-shaped, 1-10 cm long, coarsely and irregularly toothed, palmately 3- to 7-veined from the base, smooth to thinly hairy, the lower leaves stalked, the upper leaves becoming unstalked, clasping-based, reduced in the inflorescence.

Flowers: Inflorescence a loose, terminal raceme of several to many, or sometimes 1 to few, long-stalked flowers in the axils of the upper leaves, the stalks 1-4 cm long; corollas tubular, broadly funnel-shaped, yellow with maroon markings in the flaring throat, 1-3 (4) cm long, strongly 2-lipped, the lips spreading, the upper lip 2-lobed, the lower 3-lobed, densely yellow-hairy at the throat; calyces bell-shaped, green dotted or tinged with red, smooth or minutely hairy, 6-17 mm long in flower, to 20 mm and asymmetrically swollen in fruit, 5-toothed, the upper tooth larger than the others; stamens 4.

Fruits: Capsules, broadly oblong, rounded at the tip, narrowed to a short-stalked base, 7-12 mm long; seeds numerous, 0.4-0.5 mm long.

Notes: The ssp. *haidensis* has been recognized in the Queen Charlotte Islands, but it may not be much different from some of the numerous other forms previously named in this complex (see Hitchcock *et al.* 1959).

Mimulus lewisii **Pursh**

pink monkey-flower; Lewis' monkey-flower

HABITAT/RANGE:

Wet to moist streambanks, seepage areas, meadows and avalanche tracks in the montane to lower alpine zones; frequent in BC south of 55° N, except absent on the Queen Charlotte Islands; N to SE AK, E to W AB and S to CO, UT, NV and CA.

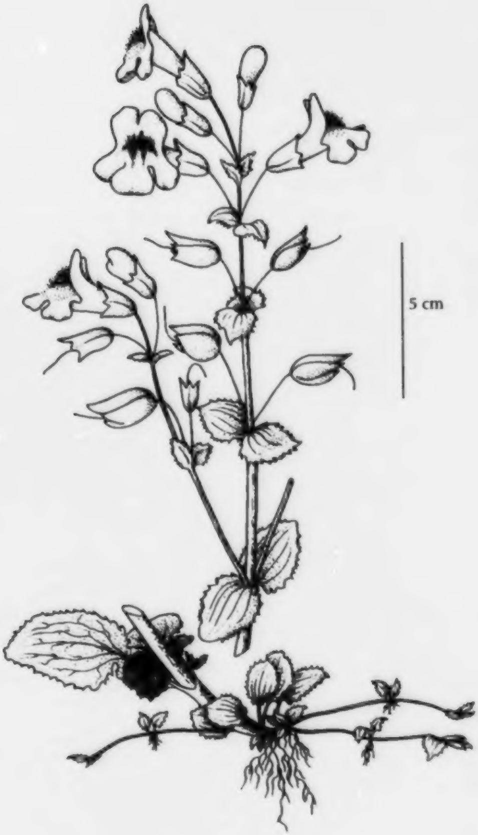
DESCRIPTION:

General: Perennial herb from a stout branching rhizome; stems robust, erect, 30-100 cm tall, sticky-soft-hairy.

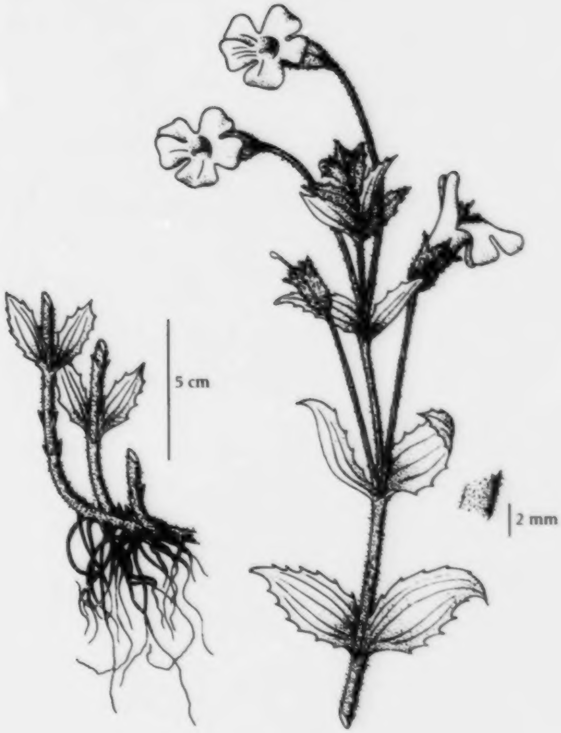
Leaves: Opposite, unstalked, usually clasping-based, lanceolate to egg-shaped or elliptic, 3-7 cm long, irregularly toothed to nearly entire, palmately 3- to 5-veined from the base, sticky-hairy; lowermost leaves much reduced.

Flowers: Inflorescence a loose terminal cluster of several, long-stalked flowers in the axils of the upper leaves, the stalks 3-10 cm long; corollas pink-purple to rose-red with yellow markings, tubular, 3-5.5 cm long, weakly 2-lipped, the lips spreading, the upper lip 2-lobed, the lower 3-lobed and with 2 yellow-hairy ridges within; calyces narrowly bell-shaped, 1.5-3 cm long, glandular-hairy, 5-toothed, the teeth triangular and more or less equal; stamens 4, the filaments smooth, the anthers long-hairy on the back.

Fruits: Capsules, narrowly oblong, long-pointed, 13-16 mm long; seeds numerous, about 0.7 mm long.



Mimulus guttatus



Mimulus lewisii

Mimulus moschatus **Dougl. *ex* Lindl.** (*M. moschatus* var. *longiflorus* A. Gray, *M. moschatus* var. *sessilifolius* A. Gray)
musk-flower

HABITAT/RANGE:

Moist meadows, streambanks, rocky ravines, roadsides, thickets, forest glades and margins in the lowland, steppe and montane zones; locally frequent in BC south of 53° N; S to CO, UT and CA.

DESCRIPTION:

General: Perennial herb from a well-developed, creeping rhizome, slimy and sticky-white-hairy throughout, often musk-scented; stems decumbent to creeping, rooting at the lower nodes, 10-70 cm long, freely branched.

Leaves: Opposite, egg-shaped, short-stalked becoming nearly unstalked upward, 1-7 cm long, remotely and sometimes vaguely coarse-toothed, pinnately veined, reduced in the inflorescence.

Flowers: Inflorescence a loose, terminal raceme of few to several, long-stalked flowers in the axils of the upper leaves, the stalks slender, 0.5-5 cm long; corollas tubular-cylindric, yellow often with red stripes or dots in the short throat, 1.5-3 cm long, weakly 2-lipped, subequally 5-lobed, the lower lip bearded along ridges at the throat; calyces bell-shaped, slimy-hairy especially on the ribs, 6-13 mm long, 5-toothed, the upper tooth slightly larger than the others; stamens 4.

Fruits: Capsules, egg-shaped, pointy-tipped, 4-9 mm long; seeds numerous, 0.2-0.3 mm long.

Mimulus tilingii **Regel**
mountain monkey-flower; large mountain monkey-flower

HABITAT/RANGE:

Wet mossy seepage areas, meadows, rivulets and streambanks in the montane to alpine zones; frequent in BC south of 52° N, infrequent in WC BC north to 54° N, except absent from the Queen Charlotte Islands; var. *caespitosus* – S to ID and OR; var. *tilingii* – E to SW AB and S to NM, AZ, CA and MX.

DESCRIPTION:

General: Low perennial herb from a creeping rhizome, sometimes also with stolons; stems erect to decumbent at the base, 5-20 cm tall, sometimes branched, smooth or sparsely hairy.

Leaves: Opposite, short-stalked to unstalked, elliptic to egg- or diamond-shaped, the blades 5-25 mm long, irregularly few-toothed, palmately 3- to 5-veined from the base; leaves not much reduced upward.

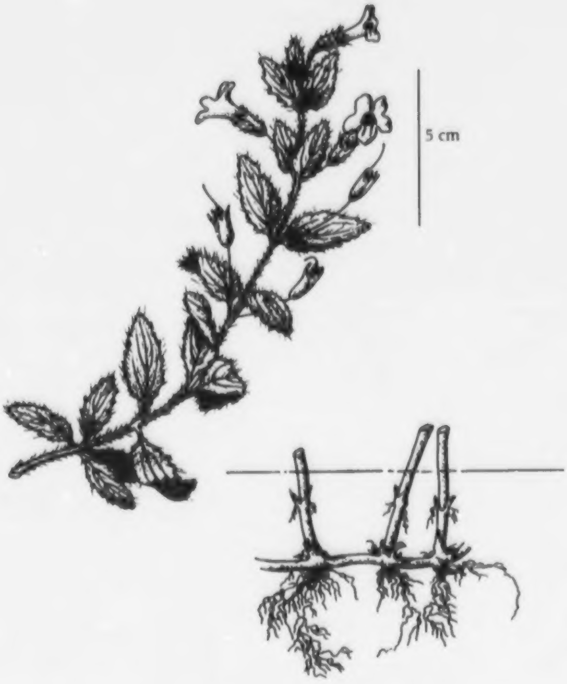
Flowers: Inflorescence of 1 to 3 (5) long-stalked flowers in the axils of the upper leaves, the stalks 1-6 cm long; corollas tubular, broadly funnel-shaped, yellow with maroon markings in the flaring throat, 2-4 cm long, strongly 2-lipped, the lips spreading, the upper lip 2-lobed, the lower 3-lobed, yellow-hairy at the throat; calyces bell-shaped, pale yellow-green with reddish spots, smooth to minutely hairy, 7-15 mm long in flower, to 20 mm and asymmetrically swollen in fruit, 5-toothed, hairy in the notches between the teeth, the upper tooth larger than the others; stamens 4.

Fruits: Capsules, oblong to oval, rounded at the tip, 5-10 mm long; seeds numerous, about 0.5 mm long.

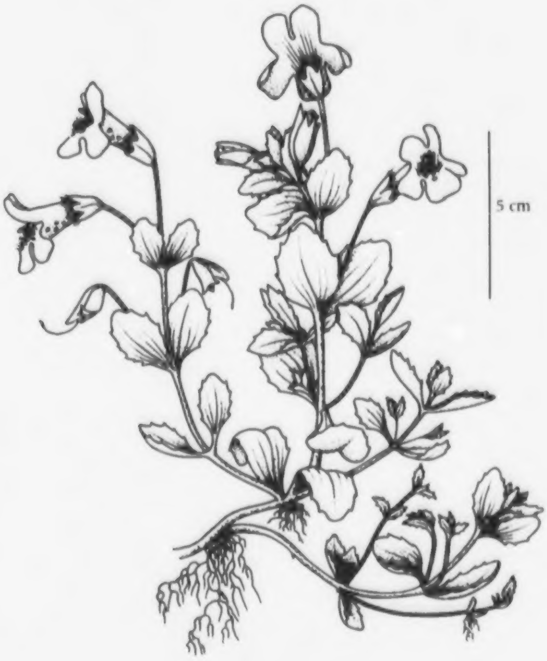
Notes: Two varieties are recognized in BC:

1. Leaves usually less than 1 cm long; plants freely branched, the branches more or less stolon-like .... var. *caespitosus* (Greene) A. L. Grant

1. Leaves usually more than 1 cm long; plants less branched, or the branches not stolon-like .... var. *tilingii*



Mimulus moschatus



Mimulus tilingii

NOTHOCHELONE

Nothochelone nemorosa **(Dougl. *ex* Lindl.) Straw** (*Penstemon nemorosus* [Dougl.] Trautv.)
woodland penstemon

HABITAT/RANGE:

Moist forests and rocky slopes in the lowland and montane zones; rare on S Vancouver Island and the adjacent mainland; S to NW CA.

DESCRIPTION:

General: Perennial herb from a branched, woody stem-base; stems several, erect, 30-80 cm tall, smooth or finely short-hairy.

Leaves: Basal leaves lacking; stem leaves opposite, mostly short-stalked, lanceolate to egg-shaped, 3-11 cm long, rather thin, saw-toothed, smooth or somewhat hairy beneath; lowermost leaves reduced.

Flowers: Inflorescence a loose, branched, terminal panicle of several, stalked flowers, the branches and stalks glandular-hairy; corollas pink-purple or blue-purple, tubular, 2.5-3.3 cm long, glandular-hairy on the outside, smooth within, distinctly 2-lipped, the lower lip longitudinally 2-ridged, much longer than the upper; calyces 6-10 mm long, 5-lobed, the lobes lanceolate to narrowly egg-shaped, entire, glandular-hairy; fertile stamens 4, the anthers densely long-woolly, the filaments long-hairy at the base and minutely hairy above; sterile stamen much shorter than the fertile ones, bearded throughout its length.

Fruits: Capsules, 11-17 mm long; seeds flattened, wing-margined, 2-3 mm long.

ORTHOCARPUS

1. Bracts and calyces glandular-hairy; upper leaves passing gradually into the bracts.
    2. Corollas yellow, the lower lip with definite short teeth; calyces subequally 4-lobed; infrequent in SC, SE and NE BC .... *O. luteus*
    2. Corollas pink-purple, the lower lip lacking teeth; calyces unequally 4-lobed, divided 2/3 in back, 1/2 on front and sides; rare in SW BC .... *O. bracteosus*

1. Bracts and calyces scarcely or not at all glandular; upper leaves passing abruptly into the distinctive bracts.
    3. Leaves entire throughout; plants rare on S Vancouver Island .... *O. imbricatus*
    3. Leaves deeply cleft, at least above; plants infrequent or rare in SC and SE BC.
        4. Upper bracts somewhat petal-like, the tips pink-purple, rounded to blunt, at most obscurely pointed .... *O. tenuifolius*
        4. Bracts not petal-like, green or yellowish-green throughout, the tips abruptly and firmly sharp-pointed .... *O. barbatus*

Orthocarpus barbatus **Cotton**
Grand Coulee owl-clover

HABITAT/RANGE:

Mesic to dry grasslands and shrublands in the steppe zone; rare in SC BC, known only from near Osoyoos; S to C WA.

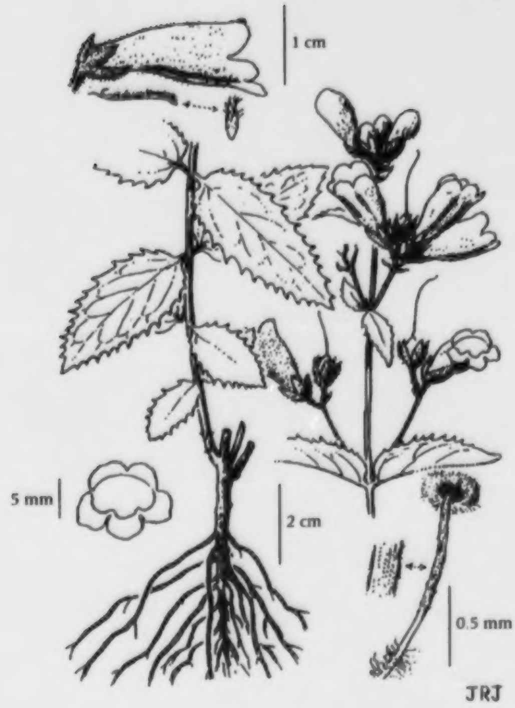
DESCRIPTION:

General: Annual herb from a taproot; stems ascending to erect, 8-25 cm tall, simple or with several erect branches; with a mixture of short and long, spreading hairs.

Leaves: Alternate, unstalked, 2-4 cm long, linear to narrowly lanceolate and entire or deeply cleft into 3 to 5 long narrow lobes, spreading-hairy.

Flowers: Inflorescence a dense, prominently bracted, terminal spike, the bracts differing abruptly from the leaves, broader and more membranous, net-veined, usually abruptly and firmly sharp-pointed at the tip, all green or yellowish-green throughout, 3- to 5-cleft into long narrow lobes, progressively less cleft above; corollas yellow, 10-12 mm long, tubular, 2-lipped, the upper lip beak-like, surpassing the lower lip by 1-1.5 mm, the lower lip broader, moderately pouched, tipped with 3 tiny teeth; calyces tubular, 2-cleft, each segment 2-lobed, the lobes slightly shorter than the tube; stamens 4.

Fruits: Capsules, ellipsoid; seeds several, with tight-fitting, netted coats.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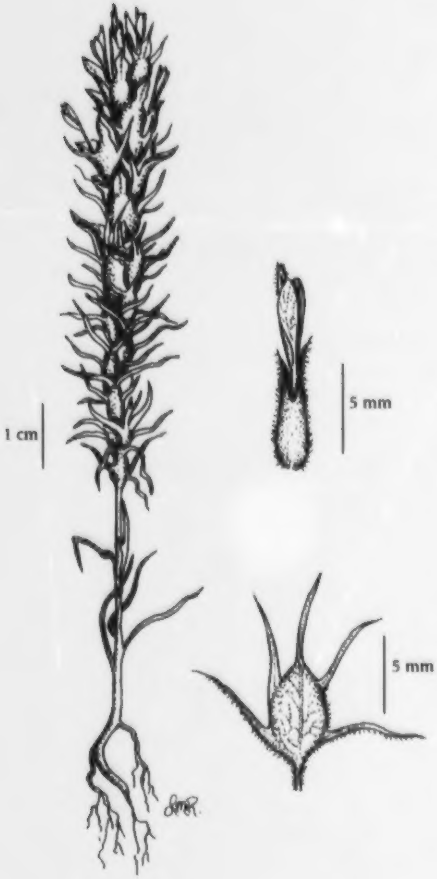
JRJ

Nothochelone nemorosa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Orthocarpus barbatus

Orthocarpus bracteosus **Benth.**

rosy owl-clover

HABITAT/RANGE:

Mesic meadows and fields in the lowland zone; rare, known recently only from Trial Island; S to N CA.

DESCRIPTION:

General: Annual herb; stems erect, 10-40 cm tall, slender, simple or branched above, short-hairy, usually purple-tinged.

Leaves: Alternate, unstalked, linear to lanceolate, 1.5-3.5 cm long, green, short-spreading-hairy and often also glandular-hairy, entire below, 3-cleft above, the upper leaves passing into the wider, 3-lobed bracts of the inflorescence.

Flowers: Inflorescence a dense, ultimately elongate, prominently bracted, densely hairy and glandular-hairy, terminal spike 3-15 cm long, the bracts uniformly green or the upper purple-tinged, glandular-soft-hairy, 10-20 mm long, differing gradually from the leaves, more or less egg-shaped, divided two-thirds of the way down into 3 (5) triangular-lanceolate lobes; corollas rose-purple, hairy, 12-20 mm long, exserted from the bracts, tubular, 2-lipped, the upper lip beaked and hooked, scarcely exceeding the lower lip, the lower lip swollen, pouched, toothless; calyces tubular, 6-10 mm long, green, glandular-hairy, unequally 4-lobed; stamens 4.

Fruits: Capsules, ellipsoid, 5-7 mm long; seeds 8 to 15, about 3 mm long, with tight-fitting, netted, ridged coats.

Notes: This species was formerly known from several locations in the Victoria area but has not been collected there since 1954.

Orthocarpus imbricatus **Torr. *ex* S. Wats.**

mountain owl-clover

HABITAT/RANGE:

Mesic to dry scree slopes and meadows in the montane zone; rare on S Vancouver Island, known only from Little Mount Hooper; S to N CA.

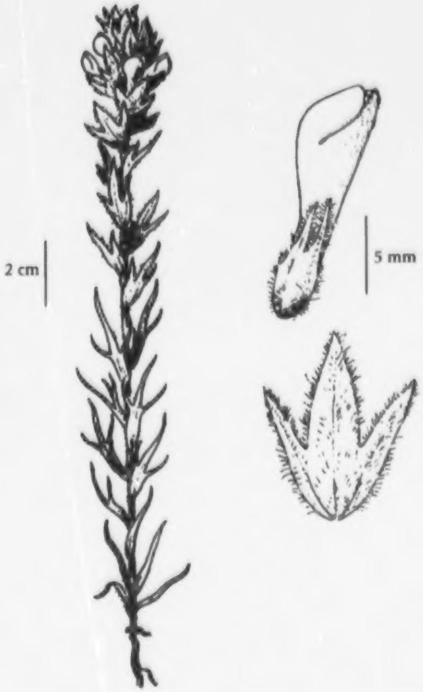
DESCRIPTION:

General: Annual herb; stems ascending to erect, 10-35 cm tall, simple or branched above; smooth to thinly short-hairy.

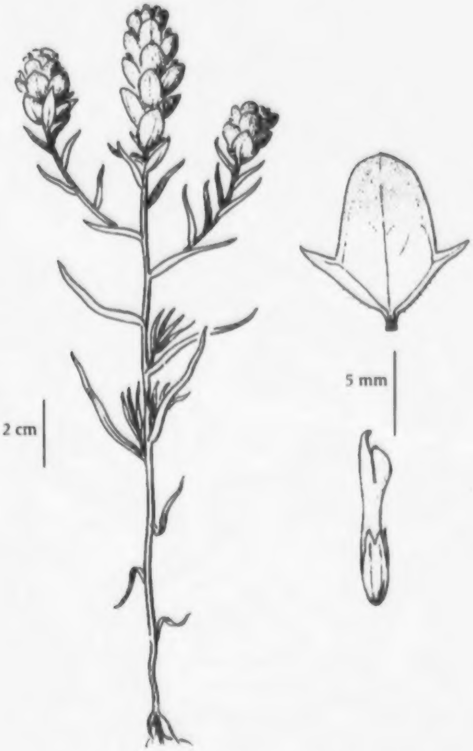
Leaves: Alternate, unstalked, linear to narrowly lanceolate, 1-5 cm long, entire, sparsely short-hairy to nearly smooth.

Flowers: Inflorescence a dense, prominently bracted, terminal spike 2-8 cm long, the bracts 10-15 mm long, differing abruptly from the leaves, shorter and much broader, blunt-tipped, net-veined, showy and petal-like, at least the upper with pink-purple tips, some with a pair of lateral teeth below the middle; corollas rose-purple, minutely hairy, 10-13 mm long, largely hidden by the bracts, tubular, 2-lipped, the upper lip beak-like and hooked, surpassing the lower lip by about 1 mm, the lower lip broader, moderately pouched, yellowish, tipped with 3 tiny teeth; calyces tubular, 5-7 mm long, hairy but non-glandular, 2-cleft, each segment 2-lobed, the lobes shorter than the tube; stamens 4.

Fruits: Capsules, ellipsoid, about 5 mm long; seeds 3 to 5, with tight-fitting netted coats.



Orthocarpus bracteosus



Orthocarpus imbricatus

Orthocarpus luteus **Nutt.**

yellow owl-clover

HABITAT/RANGE:

Dry to mesic meadows, grasslands and shrublands in the steppe and montane zones; infrequent in BC east of the Coast-Cascade Mountains and S of 56° N; E to ON and S to MN, NE, NM, AZ and CA.

DESCRIPTION:

General: Annual herb; stems erect, 10-40 cm tall, slender, simple or rarely few-branched above, spreading-hairy, often also glandular-hairy above, yellow-green sometimes becoming purple-tinged.

Leaves: Alternate, unstalked, linear to narrowly lanceolate, 1.5-4 cm long, dark green, short-spreading-hairy, usually entire, sometimes the upper 3-cleft, the upper leaves passing gradually into the wider, 3-lobed bracts of the inflorescence.

Flowers: Inflorescence a dense, ultimately elongate, prominently bracted, densely glandular-hairy, terminal spike 5-20 cm long, the bracts dark green, glandular-hairy, 10-15 mm long, differing gradually from the leaves, 3-lobed, the 2 lateral lobes small, divergent, about half as long as the narrowly egg-shaped middle lobe; corollas golden-yellow, minutely hairy, 9-15 mm long, exserted from the bracts, tubular, about equally 2-lipped, the upper lip beaked and minutely hooked, the lower lip swollen, pouched, minutely 3-toothed; calyces tubular, 5-8 mm long, green, glandular-hairy, subequally 4-lobed; stamens 4.

Fruits: Capsules, ellipsoid, 5-7 mm long; seeds 20 to 35, about 1 mm long, with tight-fitting, netted, wrinkled coats.

Orthocarpus tenuifolius **(Pursh) Benth.**

thin-leaved owl-clover

HABITAT/RANGE:

Moist to dry, open sites in the steppe and montane zones; infrequent in extreme SC and SE BC; S to MT, ID and OR.

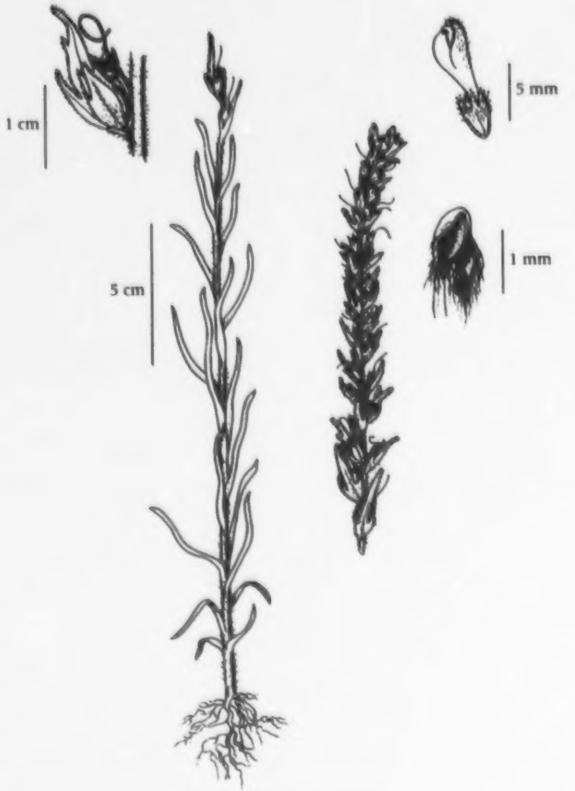
DESCRIPTION:

General: Annual herb; stems erect, 10-30 cm tall, simple or branched above; short-hairy.

Leaves: Alternate, unstalked, 1-5 cm long, the lowermost linear and entire, the others with 1 or 2 pairs of slender lobes, short-hairy.

Flowers: Inflorescence a dense, prominently bracted, terminal spike, the bracts differing abruptly from the leaves, shorter, broader, blunt-tipped, net-veined, at least the upper showy and petal-like with pink-purple tips, the lower with a pair of slender lateral lobes and commonly bristle-fringed below the middle; corollas yellow, sometimes purplish-tipped, hairy, 14-20 mm long, largely hidden by the bracts, tubular, 2-lipped, the upper lip beak-like and hooked, surpassing the lower lip by about 1 mm, the lower lip broader, moderately pouched, tipped with 3 tiny teeth; calyces tubular, hairy but non-glandular, 2-cleft, each segment 2-lobed, the lobes shorter than the tube; stamens 4.

Fruits: Capsules, ellipsoid; seeds several, with netted coats.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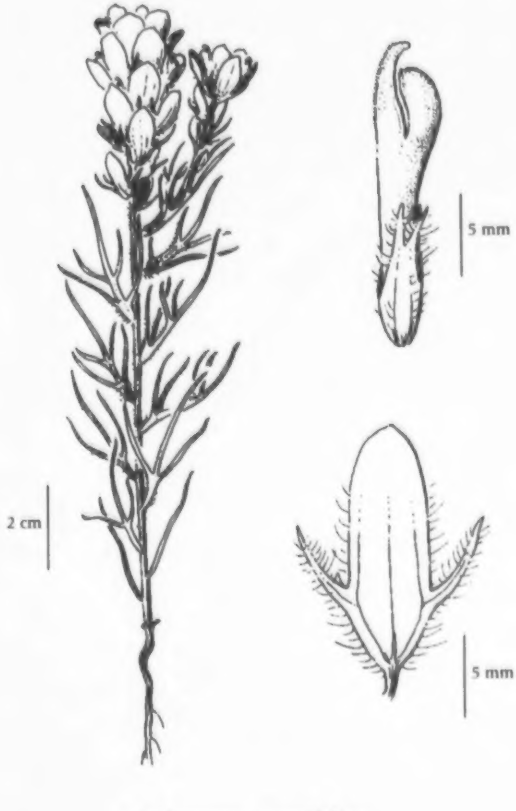
Orthocarpus luteus



Orthocarpus tenuifolius

PARENTUCELLIA

Parentucellia viscosa **(L.) Caruel**

yellow parentucellia

HABITAT/RANGE:

Moist fields, pastures and grassy or sandy clearings in the lowland zone; frequent on S Vancouver Island, the Gulf Islands and adjacent lower mainland; introduced from Europe.

DESCRIPTION:

General: Annual herb from fibrous roots; stems erect, 10-50 cm tall, usually unbranched, coarse-hairy below becoming glandular-hairy upward.

Leaves: Opposite or some of the upper leaves alternate or offset, unstalked, lanceolate, 1-4 cm long, coarsely toothed, distinctly veined, glandular-hairy.

Flowers: Inflorescence a leafy-bracted, terminal, spike-like cluster of several to many, nearly unstalked flowers; corollas yellow, tubular, 1.5-2 cm long, 2-lipped, the upper lip hood-like, the lower lip 3-lobed; calyces sticky-hairy, tubular, 1-1.5 cm long, 4-toothed, the teeth lanceolate, about as long as the tube; stamens 4, the anthers hairy.

Fruits: Capsules, lance-cylindric, hairy; seeds numerous, small, smooth.

PEDICULARIS

1. Stem leaves whorled .... *P. verticillata*

1. Stem leaves alternate or lacking.

2. Leaves merely toothed .... *P. racemosa*

2. Leaves pinnately lobed to twice pinnately cleft.

3. Stems freely branched throughout, or with at least some axillary branches.

4. Hood-like upper corolla lips with a pair of long, slender teeth near the tip, the teeth 0.5-2 mm long; corollas predominantly yellow (sometimes flushed with purple or pink, rarely wholly purple or pink) .... *P. labradorica*

4. Hood-like upper corolla lips with a pair of short, blunt teeth near the tip, the teeth less than 0.5 mm long, or teeth lacking; corollas purple or pink .... *P. parviflora*

3. Stems simple.

5. Plants leafy-stemmed; basal leaves, if present, not markedly larger than the stem leaves.

6. Plants usually more than 20 cm tall; leaves deeply pinnately cleft, blades 5-15 cm long .... *P. bracteosa*

6. Plants usually 5-15 cm tall; leaves pinnately lobed, blades 2-4 cm long .... *P. langsdorfii*

5. Plants with leaves mostly basal; stem leaves few and reduced.

7. Hood-like upper corolla lips with distinct beaks at least 2 mm long.

8. Beaks straight, 2-4 mm long .... *P. ornithorhyncha*

8. Beaks strongly curved, usually more than 4 mm long.

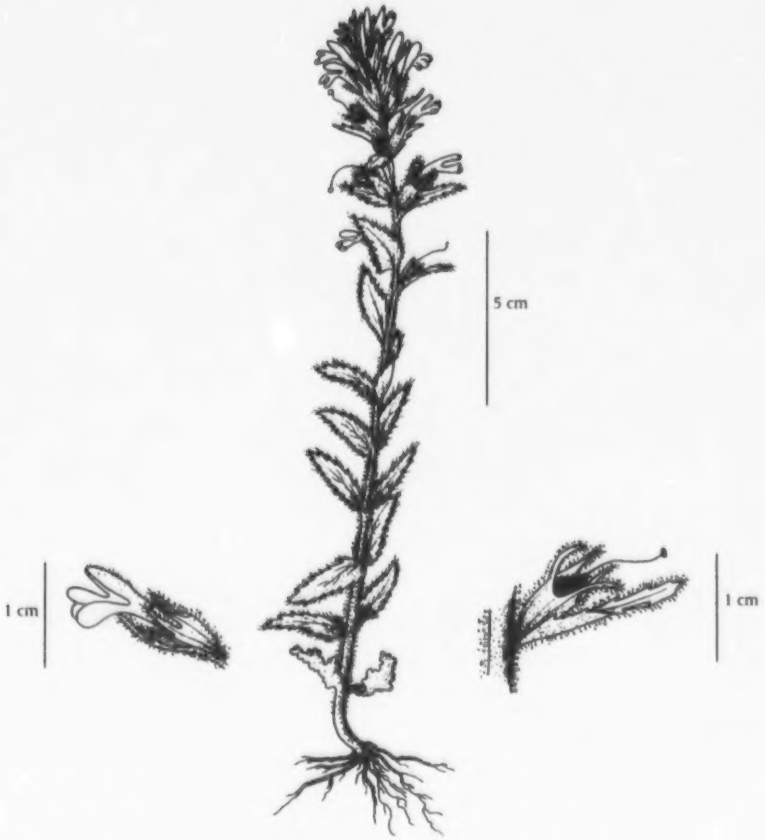
9. Beaks curved down, equal to or slightly longer than the well-developed lower corolla lips .... *P. contorta*

9. Beaks curved upward, much longer than the poorly-developed lower corolla lips .... *P. groenlandica*

7. Hood-like upper corolla lips beakless, or with inconspicuous points less than 1 mm long.

10. Corollas yellow or creamy-white, sometimes flushed with pink or purple, especially toward tip of hood-like upper lips.

11. Flowers usually fewer than 10 per inflorescence, in nearly flat-topped heads; flowers 2.5-3.5 cm long; hood-like upper lips longer than corolla tubes .... *P. capitata*



Parentucellia viscosa

11. Flowers usually more than 10 per inflorescence, in elongated racemes; flowers 2-2.5 cm long; hood-like upper lips about equal to or shorter than the corolla tubes .... *P. oederi*

10. Corollas pink to purple.

12. Stems apparently leafless (0-2); flowers spirally arranged, the upper corolla lips dark purple ..... *P. sudetica*

12. Stems leafy; flowers not spirally arranged, the upper corolla lips pink.

13. Hood-like upper lips with a pair of teeth near the tip; leaves pinnately lobed to cleft .... *P. langsdorfii*

13. Hood-like upper lips lacking a pair of teeth near the tip; leaves pinnately cleft to pinnately compound .... *P. lanata*

Pedicularis bracteosa **Benth.**

bracted lousewort; wood-betony; fernleaf

HABITAT/RANGE:

Moist meadows, thickets and open forests in the montane to alpine zones; common throughout BC south of 56° N; var. *bracteosa* – E to AB and S to MT, ID and OR; var. *latifolia* – S to ID and WA.

DESCRIPTION:

General: Perennial herb from a mix of coarse fibrous and tuberous-thickened roots, smooth except long-hairy in the inflorescence; stems single or clustered, erect, 30-100 cm tall, unbranched.

Leaves: Basal leaves similar to the stem leaves but longer-stalked, or much smaller or lacking; stem leaves alternate, short-stalked to unstalked, 7-16 cm long, deeply pinnately cleft into narrowly oblong to lanceolate segments, the main segments 1-7 cm long, jaggedly incised and also finely saw-toothed or merely double-toothed, the leaves reduced and less divided upward.

Flowers: Inflorescence a dense, elongate, terminal spike of numerous flowers, above several hairy, leaflike but undivided bracts; corollas yellow or tinged with red or purple to wholly purple, 13-21 mm long, 2-lipped, the upper lip hood-like, beakless or very short-beaked, about as long as the tube, the lower lip 3-lobed; calyces 7-10 mm long, hairy, 5-lobed, the lobes glandular-hairy to nearly smooth, the upper lobe shortest; stamens 4.

Fruits: Capsules, asymmetrical, flattened, curved, smooth, 10-12 mm long; seeds several, 2-5 mm long, net-veined.

Notes: Two varieties occur in BC:

1. Free tips of the lateral calyx-lobes very slender, threadlike, glandular; the common variety .... var. *bracteosa*

1. Free tips of the lateral calyx-lobes lanceolate to triangular, sparsely or not at all glandular; infrequent in C and S BC .... var. *latifolia* (Pennell) Cronq.

Pedicularis capitata **Adams**

capitate lousewort

HABITAT/RANGE:

Moist rocky or grassy slopes, meadows, heath and tundra in the subalpine to alpine zones; frequent in BC north of 54° N; amphiberingian, N to AK, YT and NT and E to AB, disjunct to PQ; Greenland, Asia.

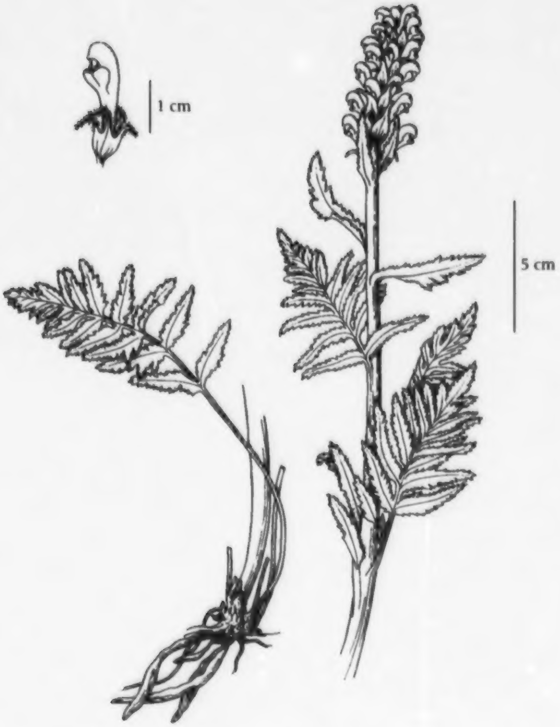
DESCRIPTION:

General: Perennial herb from a slender branched rhizome; stems single, erect, 5-15 cm tall, unbranched, usually short-hairy or long-hairy in the inflorescence.

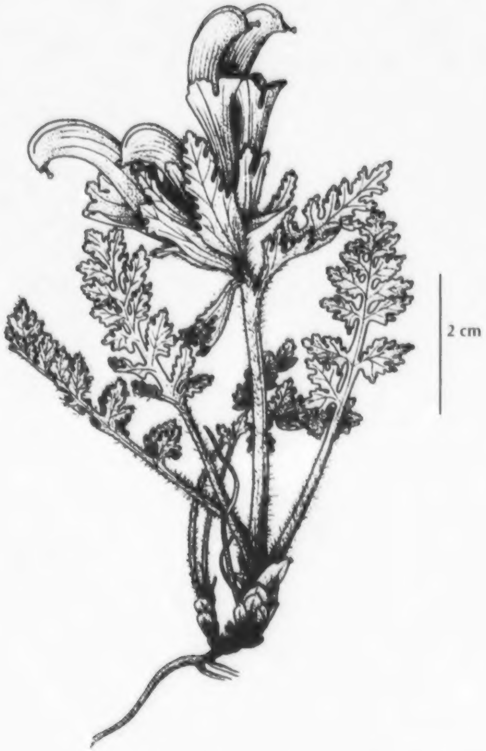
Leaves: Basal leaves long-stalked, once pinnately compound, oblong to oblong-elliptic, 3-7 cm long, the leaflets pinnately cleft or dissected and toothed, hairy to smooth; stem leaves lacking or 1 or 2 below the inflorescence, alternate, reduced.

Flowers: Inflorescence a dense, head-like, bracted, terminal spike of 1 to 8 flowers, the bracts hairy, similar to the leaves but reduced, unstalked and less divided; corollas cream or yellowish-white, often tinged with pink or purple at the tip, 25-40 mm long, 2-lipped, the upper lip 15-25 mm long, strongly arched, hood-like, beakless but usually with a pair of teeth near the tip, the lower lip 3-lobed, to 15 mm long; calyces 9-16 mm long, 5-lobed, the lobes rather broad, 4-10 mm long, often blunt-toothed near the tip; stamens 4, the filaments smooth.

Fruits: Capsules, 12-15 mm long; seeds several.



Pedicularis bracteosa



Pedicularis capitata

Pedicularis contorta* Benth. var. *contorta

coil-beaked lousewort

HABITAT/RANGE:

Dry rocky slopes, meadows and open forests in the montane to alpine zones; infrequent in SE BC; E to SW AB and S to WY and CA.

DESCRIPTION:

General: Perennial herb from a thick stem-base, smooth throughout; stems several, clustered, erect, 15-60 cm tall, unbranched.

Leaves: Basal leaves long-stalked, lance-oblong in outline, 5-18 cm long, deeply pinnately cleft, the segments linear and toothed; stem leaves alternate, several, reduced and becoming unstalked upward.

Flowers: Inflorescence an elongate, bracted, terminal spike of numerous flowers, the spike smooth, 5-15 (20) cm long, the bracts narrow, divided, shorter than the flowers; corollas yellowish-white or white, often with pink or purplish markings, 15-20 mm long including the beak, 2-lipped, the upper lip short (4-5 mm), strongly arched, hooded, prolonged into a downcurved beak 6-8 mm long, the lower lip 5-7 mm long, 3-lobed, the lateral lobes often enfolding the beak of the upper lip; calyces 4-5 mm long, 5-toothed, the teeth lanceolate, 1-3 mm long, the upper tooth shortest, the tube somewhat papery between the 5 dark veins; stamens 4.

Fruits: Capsules, straight, 9-10 mm long; seeds several, about 2 mm long.

***Pedicularis groenlandica* Retz.**

elephant's-head lousewort

HABITAT/RANGE:

Moist to wet meadows, thickets, swamps, seepage sites and streambanks in the montane to subalpine zones; locally frequent in and E of the Coast-Cascade Mountains in S BC, infrequent northward E of the Coast Mountains; N to S AK, YT and NT; E to PQ and S to NM, AZ and CA; Greenland.

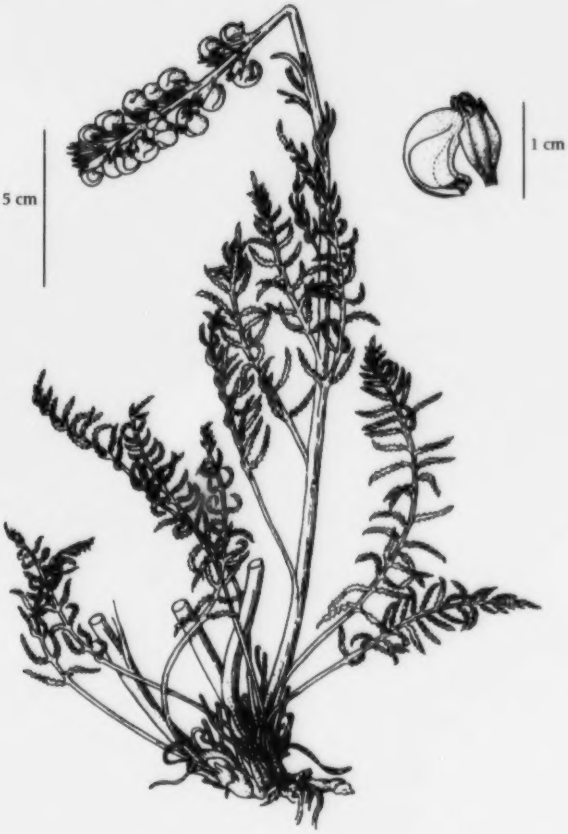
DESCRIPTION:

General: Perennial herb from fibrous roots sometimes surmounted by a stem-base, smooth throughout except for the calyx-teeth; stems 1 to several, often clustered, erect, 15-70 cm tall, unbranched, sometimes reddish-purple.

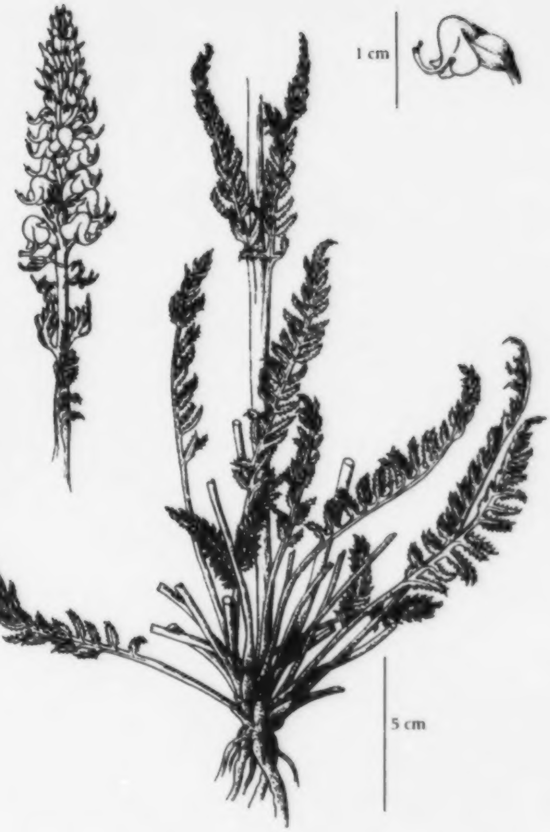
Leaves: Basal leaves long-stalked, oblong-lanceolate, 5-25 cm long, pinnately lobed to deeply cleft, the lobes narrow and toothed; stem leaves alternate, several, reduced and becoming unstalked upward.

Flowers: Inflorescence a fairly dense, elongated, bracted, terminal spike of numerous flowers, the spike smooth, 4-20 cm long, the bracts similar to the leaves but much reduced, shorter than the flowers; corollas pink to reddish-purple, 10-25 mm long including the beak, 2-lipped, the upper lip short (2-3 mm), strongly hooded, prolonged into an elongate, upcurved beak (resembling an elephant trunk) 7-18 mm long, the lower lip 3-8 mm long, 3-lobed, the lobes deflexed-spreading; calyces 4-7 mm long, 5-toothed, the teeth broadly triangular, more or less equal, about 1 mm long, fringed with hairs; stamens 4, the filaments smooth.

Fruits: Capsules, asymmetrical, 7-14 mm long; seeds several, about 3 mm long, winged, net-veined.



Pedicularis contorta* var. *contorta



Pedicularis groenlandica

***Pedicularis labradorica* Wirsing**

Labrador lousewort

HABITAT/RANGE:

Wet to dry forests, thickets, clearings, rocky or peaty slopes, swamps and bogs in the montane to subalpine zones; frequent in BC north of 53° N; circumpolar, N to AK, YT and NT and E to NF; Greenland, Eurasia.

DESCRIPTION:

General: Annual, biennial or short-lived perennial herb from a spindly taproot; stems ascending to erect, 10-30 cm tall, 1 to several, simple or more commonly branched, white-hairy typically in lines below the leaf bases, increasingly so upward.

Leaves: Basal leaves small; stem leaves alternate, stalked, pinnately cleft to lobed, the segments coarsely toothed, the stalks wing-margined; leaves gradually reduced upward.

Flowers: Inflorescence compact to elongate, of few to several (5 to 10) flowers in a terminal cluster or in axils of the stem leaves; corollas yellow, often with orange or red markings, 13-17 mm long, 2-lipped, the upper lip 4-7 mm long, slightly arched, hood-like, beakless or short-beaked but with a pair of slender teeth near the tip, the lower lip 3-lobed, fringed with minute hairs; calyces 4-6 mm long, smooth or somewhat hairy at the base, 2- to 3-lobed; stamens 4, the filaments long-hairy or smooth.

Fruits: Capsules, narrowly oblong, pointy-tipped, flattened, borne horizontally; seeds several.

Pedicularis lanata* Cham. & Schlecht. ssp. *lanata (*P. kanei* Durand)

woolly lousewort

HABITAT/RANGE:

Mesic to dry rocky slopes and ridges and grassy tundra in the alpine zone; infrequent in BC north of 54° N; circumpolar, N to AK, YT and NT and E to AB, disjunct to N PQ; Greenland, Eurasia.

DESCRIPTION:

General: Perennial herb from a thick yellow taproot; stems usually single, erect, 5-30 cm tall, unbranched, densely long-hairy to white-woolly, especially in the inflorescence.

Leaves: Basal leaves numerous, long-stalked, narrowly lanceolate, deeply pinnately lobed to pinnately compound, the lobes toothed to pinnately cleft; stem leaves alternate, short-stalked, rather numerous and not much smaller than the basal ones.

Flowers: Inflorescence a dense, bracted, terminal spike of numerous flowers, the spike soon elongating, the bracts similar to the leaves but reduced upward, white-woolly; corollas pink to lavender, smooth, 15-20 (25) mm long, 2-lipped, the upper lip somewhat arched, hood-like, beakless and lacking teeth, the lower lip about as long as the upper, 3-lobed; calyces 4-5 mm long, long-woolly, 5-toothed, the teeth triangular, about 1 mm long; stamens 4, the filaments long-hairy.

Fruits: Capsules, egg-shaped, pointy-tipped, 8-13 mm long; seeds several, with a loose, ashy-grey, honeycombed seed-coat.

***Pedicularis langsdorfii* Fisch. *ex* Steven ssp. *arctica* (R. Br.) Pennell**

Langsdorf's lousewort

HABITAT/RANGE:

Moist to dry tundra, heath, rocky meadows, slopes and ridges in the alpine zone; frequent in BC east of the Coast Mountains and north of 52° N; circumpolar, N to AK, YT and NT and E to SW AB; Greenland, N Asia.

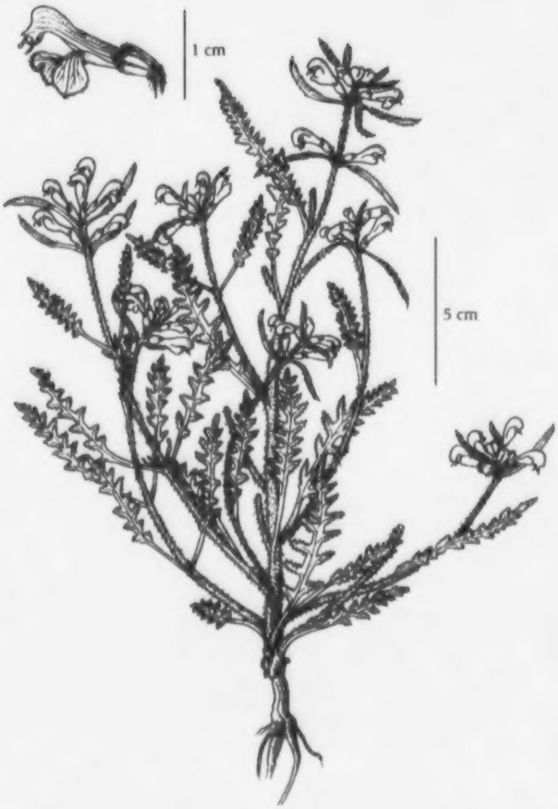
DESCRIPTION:

General: Perennial herb from a stout yellow taproot surmounted by a heavy, somewhat woody stem-base; stems 1 to several, erect, 5-30 cm tall, unbranched, nearly smooth to somewhat long-woolly.

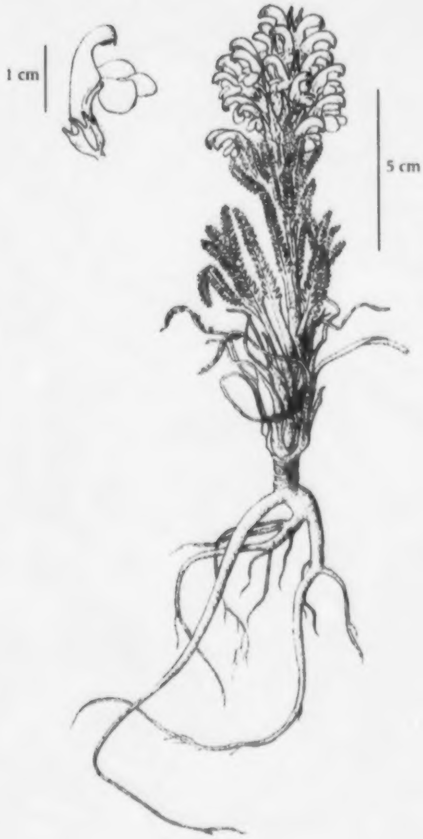
Leaves: Basal leaves stalked, lanceolate, 4-7 cm long, pinnately lobed to deeply cleft, the lobes round-toothed to entire, the stalks somewhat winged; stem leaves alternate, rather numerous and not much smaller than the basal ones.

Flowers: Inflorescence a dense, bracted, terminal spike of several to many flowers, the spike compact to elongated, the bracts similar to the leaves but reduced upward; corollas pink to purple, 20-25 mm long, 2-lipped, the upper lip 8-12 mm long, arched, hood-like, beakless but with a pair of slender teeth near the tip, the lower lip 3-lobed; calyces 7-10 mm long, long-woolly, 5-toothed, the teeth triangular, 2-3 mm long; stamens 4, the filaments long-hairy to nearly smooth.

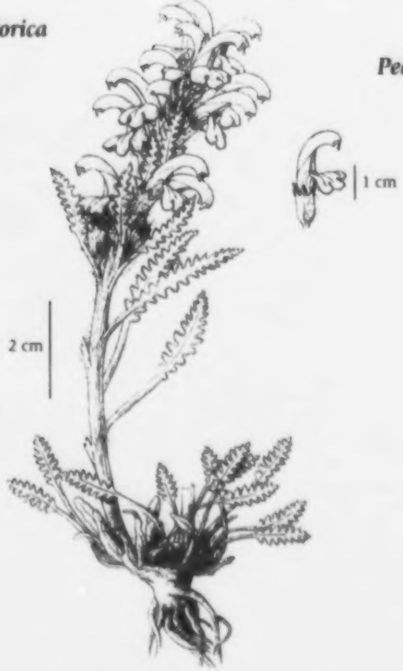
Fruits: Capsules, lance-oblong, asymmetrical, somewhat flattened and curved, smooth, 12-15 mm long; seeds several.



Pedicularis labradorica



Pedicularis lanata ssp. *lanata*



Pedicularis langsdorfii ssp. *arctica*

Pedicularis oederi **Vahl *ex* Hornem**

Oeder's lousewort

HABITAT/RANGE:

Mesic to moist meadows, tundra and rocky slopes in the alpine zone; infrquent in BC north of 54° N; circumboreal, N to AK, YT and NT; E to AB and S to WY; Eurasia.

DESCRIPTION:

General: Perennial herb from thickened, spindle-shaped roots; stems usually single, erect, 5-25 cm tall, unbranched, nearly smooth to soft-hairy or long-woolly, especially in the inflorescence.

Leaves: Basal leaves long-stalked, oblong to lanceolate, 3-10 cm long, pinnately lobed to deeply cleft, the lobes toothed; stem leaves alternate, few, stalked, reduced.

Flowers: Inflorescence a dense, bracted, terminal spike of several to many flowers, the spike compact to elongated, the bracts hairy, similar to the leaves but merely toothed and reduced upward; corollas yellow sometimes with purplish markings, 15-25 mm long, 2-lipped, the upper lip 5-9 mm long, somewhat arched, hood-like, beakless and lacking teeth, often purplish at the tip, the lower lip 3-lobed; calyces 7-11 mm long, hairy, 5-toothed, the teeth triangular, 2-3 mm long, sometimes few-toothed near the tip; stamens 4, the filaments long-hairy.

Fruits: Capsules, lance-oblong, 11-16 mm long; seeds several.

Pedicularis ornithorhyncha **Benth.**

bird's-beak lousewort

HABITAT/RANGE:

Mesic to moist meadows, heath, tundra, streambanks and open rocky slopes in the subalpine and alpine zones; frequent in and W of the Coast-Cascade Mountains, infrequent in C and rare in SC BC; N to S AK and S to W WA.

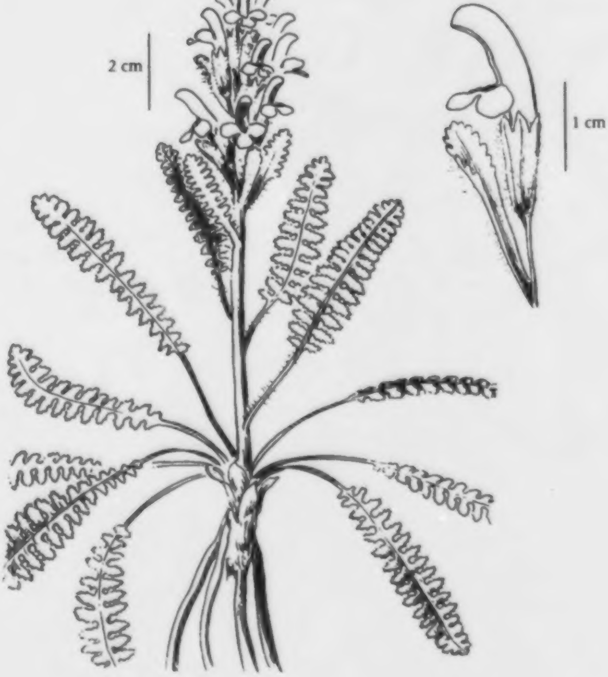
DESCRIPTION:

General: Perennial herb from fibrous-rooted stem-base; stems 1 to several, often clustered, erect, 5-30 cm tall, unbranched, smooth except long-hairy in the inflorescence.

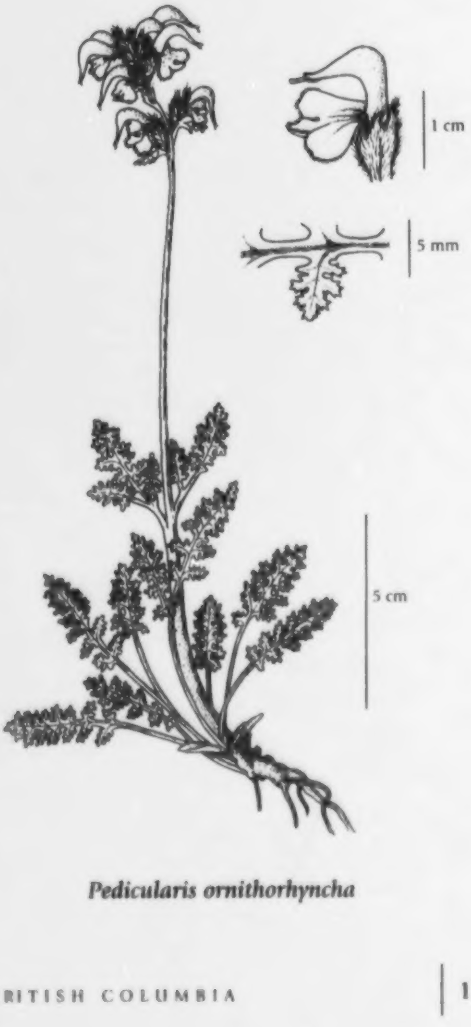
Leaves: Basal leaves long-stalked, lanceolate to oblong-elliptic, 3-12 cm long, pinnately compound to lobed, the divisions deeply cleft and often also toothed; stem leaves alternate, few and reduced, or lacking.

Flowers: Inflorescence a fairly dense, head-like to somewhat elongate, bracted, terminal spike of few to several flowers, the bracts somewhat cleft or dissected, much smaller than the leaves; corollas purple, 10-17 mm long including the beak, 2-lipped, the upper lip 6-8 mm long, strongly hooded, prolonged into a straight, conical beak 2-4 mm long, the lower lip 3-lobed, the lobes deflexed-spreading; calyces long-hairy, 7-10 mm long, 5-toothed, the teeth lanceolate, more or less equal, 1.5-3 mm long; stamens 4, the filaments long-soft-hairy.

Fruits: Capsules, asymmetrical, 10-15 mm long; seeds several.



Pedicularis oederi



Pedicularis ornithorhyncha

Pedicularis parviflora **Sm.** ***ex*** **Rees. ssp.** ***parviflora*** (*P. macrodonta* Richards., *P. pennellii* Hult. ssp. *insularis* Calder & Taylor)

small-flowered lousewort

HABITAT/RANGE:

Wet meadows, fens and bogs in the montane and subalpine zones; rare in BC north of 52° N; circumboreal, N to AK, YT and NT; E to PQ; N Asia.

DESCRIPTION:

General: Annual or biennial herb from a spindly taproot; stems single, ascending to erect, 10-40 cm tall, simple or more commonly branched, smooth except sometimes minutely hairy in the inflorescence.

Leaves: Basal leaves small or lacking; stem leaves alternate, unstalked, lance-oblong, 1-5 cm long, pinnately cleft to lobed, the segments toothed or entire.

Flowers: Inflorescences several-flowered, compact, somewhat head-like clusters at the ends of branches, often elongating and with a few lower, remote, axillary flowers, the bracts similar to the leaves but reduced upward; corollas purple or two-toned pinkish and purple, 11-17 mm long, 2-lipped, the upper lip 4-7 mm long, slightly arched, hood-like, beakless, with or more often without a pair of slender teeth near the tip, the lower lip 3-lobed, fringed with minute hairs; calyces 4-6 mm long, 2-lobed, the lobes jaggedly toothed; stamens 4, the filaments long-hairy.

Fruits: Capsules, egg-shaped, abruptly pointy-tipped, smooth, 8-17 mm long, partly enveloped by dry expanded calyces; seeds several.

Notes: The relationship between this species, *P. macrodonta*, and the entity found on the Queen Charlotte Islands that has been named *P. pennellii* ssp. *insularis*, needs further clarification. It seems best to consider them synonymous with *P. parviflora* ssp. *parviflora*.

Pedicularis racemosa **Dougl.** ***ex*** **Hook.**

sickletop lousewort

HABITAT/RANGE:

Moist to dry coniferous forests, open rocky slopes and meadows in the montane to subalpine zones; frequent in S BC, south of 53° N; S to CA.

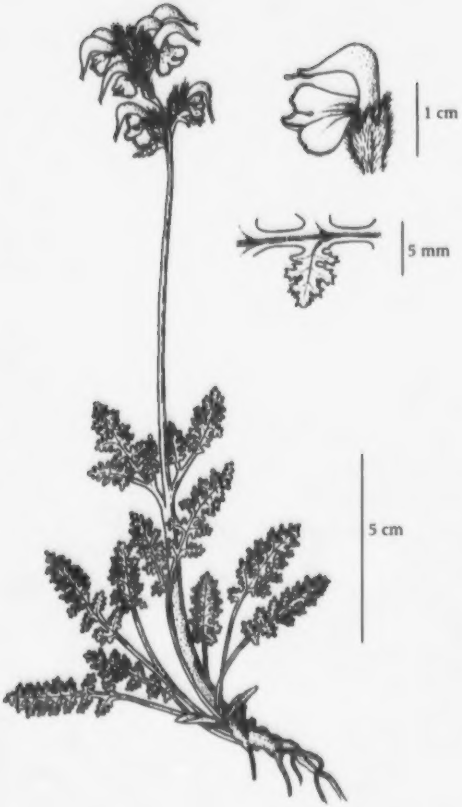
DESCRIPTION:

General: Perennial herb from a thick stem-base with coarse fibrous roots, smooth or nearly so throughout; stems usually several, clustered, erect, 15-50 cm tall, unbranched.

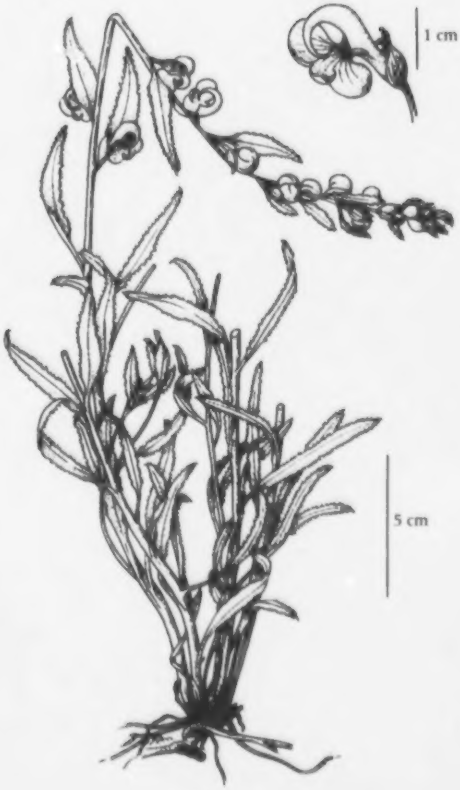
Leaves: Basal leaves lacking or much reduced; stem leaves alternate, numerous, short-stalked to unstalked, narrowly lanceolate, 4-10 cm long, reduced downward, not divided but the margins finely toothed.

Flowers: Inflorescence a rather loose, elongate, bracted, terminal raceme of several flowers, the lower flowers sometimes stalked in the leaf axils, the bracts (especially the lower ones) leaflike, equalling or longer than the flowers; corollas cream to pinkish-white or purplish, 10-16 mm long, 2-lipped, the upper lip 5-9 mm long, strongly arched, hooded, prolonged into a slender beak 5-7 mm long, the beak curved down and in toward the lower lip, which is 5 mm long and deflexed-spreading; calyces 5-8 mm long, 2-lobed, the lobes obliquely egg-shaped, 1-3 mm long; stamens 4.

Fruits: Capsules, asymmetrical, 10-16 mm long; seeds several, about 2 mm long.



Pedicularis parviflora ssp. *parviflora*



Pedicularis racemosa

Pedicularis sudetica **Willd. ssp.** ***interior*** **(Hult.) Hult.**

Sudeten lousewort

HABITAT/RANGE:

Moist to wet meadows, thickets, open forest, peaty seepage sites, streambanks, rocky slopes, heath and tundra in the subalpine and alpine zones; frequent in BC east of the Coast Mountains north of 52° N; circumpolar, N to AK and YT; Eurasia.

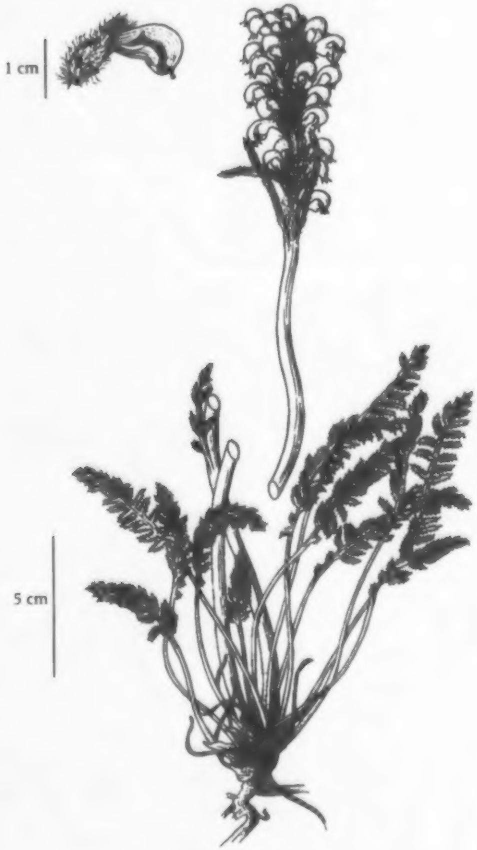
DESCRIPTION:

General: Perennial herb from a stout branched rhizome; stems 1 to several, clustered, erect, 5-50 cm tall, unbranched, often purplish, nearly smooth to somewhat long-hairy, long-woolly in the inflorescence.

Leaves: Leaves all or mostly basal, stalked, lanceolate, 4-7 cm long, pinnately lobed to deeply cleft, the lobes toothed or cleft and the ultimate divisions again toothed, the leaf axis broad; stem leaves 0 to 2 or 3, alternate, reduced.

Flowers: Inflorescence a terminal spike of several to many flowers, the spike compact at first then elongating, subtended by 1 or 2 bracts similar to the leaves but much smaller, the flowers spirally arranged; corollas pink to purple or two-toned, 15-25 mm long, 2-lipped, the upper lip often darker, somewhat arched, hood-like, 6-13 mm long, beakless but with a pair of slender teeth near the tip, the lower lip often spotted, 3-lobed, shorter than the upper lip; calyces 8-12 mm long, white-woolly to smooth, 5-toothed, the teeth lanceolate, 3-5 mm long; stamens 4, the filaments smooth.

Fruits: Capsules, oblong, abruptly short-beaked, 9-14 mm long; seeds several.



Pedicularis sudetica ssp. *interior*

***Pedicularis verticillata* L.**

whorled lousewort

HABITAT/RANGE:

Moist meadows, rocky slopes, heath and turfy tundra in the montane to alpine zones; rare in N BC and the Queen Charlotte Islands; N to AK, YT and NT.

DESCRIPTION:

General: Perennial herb from a taprooted, branching stem-base; stems 1 to several, clustered, erect to ascending, 10-40 cm tall, unbranched, nearly smooth to thinly long-hairy, but long-hairy to woolly in the inflorescence.

Leaves: Mostly basal, long-stalked, lanceolate, 4-7 cm long, deeply pinnately lobed, the lobes toothed or cleft, the stalks sparsely hairy; stem leaves in usually 1 or 2 whorls below the inflorescence, similar to the basal leaves but short-stalked to unstalked.

Flowers: Inflorescence a terminal spike of usually many flowers in several whorls, the spike compact at first then elongating, bracts similar to the leaves but much reduced upward and mostly shorter than the flowers; corollas rose-pink to purplish, 11-18 mm long, 2-lipped, the upper lip slightly arched, hood-like, 5-8 mm long, beakless and lacking a pair of teeth near the tip, the lower lip 3-lobed, slightly longer than the upper lip; calyces 3-7 mm long, hairy, 5-toothed, the teeth triangular, 0.5-1 mm long, entire, purple-veined, fringed with long hairs; stamens 4, the filaments sparsely long-hairy.

Fruits: Capsules, lance-egg-shaped, pointy-tipped, 10-15 mm long; seeds several.

PENSTEMON[6]

1. Anthers densely long-woolly with tangled hairs.
    2. Plants 30-80 cm tall, herbaceous nearly to the base; leaves all on the stem, the lower ones reduced, the better developed leaves often more than 6 cm long or more than 2.5 cm wide, or both .... *P. lyallii*
    2. Plants 5-40 cm tall, distinctly woody at base; leaves basal or near-basal as well as along the stem, not over 6 cm long and 2.5 cm wide.
        3. Plants ascending or erect, branched above the ground surface, the leaf clusters elevated above ground, not forming mats; plants usually well over 15 cm tall; leaf blades 2-10 times as long as wide .... *P. fruticosus*
        3. Plants forming dense mats on surface of the ground; plants usually less than 15 cm tall; leaf blades 1-2.5 times as long as wide.
            4. Leaves of erect flowering shoots well developed, usually more than 1 cm long; plants from SE BC .... *P. ellipticus*
            4. Leaves of erect flowering shoots bract-like, less than 1 cm long; plants from Coast-Cascade Mountains and westward .... *P. davidsonii*
1. Anthers smooth or with inconspicuous short hairs.
    5. Pollen sacs opening along their confluent apices, horseshoe-shaped.
        6. Plants glandular; leaves deeply saw-toothed to jaggedly pinnately cleft; corollas 22-35 mm long .... *P. richardsonii*
        6. Plants not glandular; leaves entire to saw-toothed; corollas 15-25 mm long. .... *P. serrulatus*
    5. Pollen sacs opening throughout their length, spreading after dehiscence, not horseshoe-shaped.
        7. Plants not glandular; leaves entire or nearly entire.
            8. Capsules 9-12 mm long; mouth of corollas smooth; stem-bases compactly branched, not creeping .... *P. nitidus*
            8. Capsules 3-7 mm long; mouth of corollas bearded; stem-bases creeping along surface of ground.

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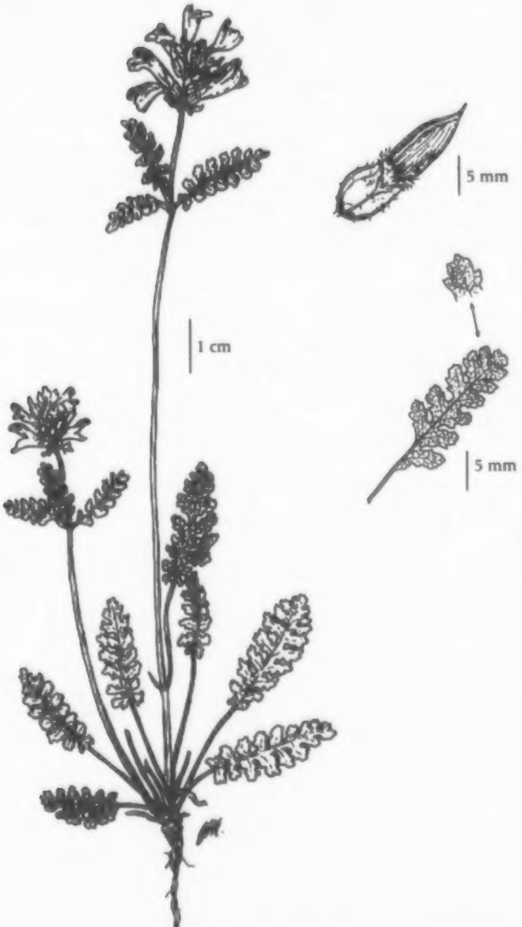
[6] Key adapted from Hitchcock *et al.* (1959).



Pedicularis verticillata

9. Corollas blue to purple (white forms rarely); bracts of the inflorescences entire, not papery-margined .... *P. procerus*

9. Corollas yellow to yellowish-white; bracts of the inflorescences papery and ragged on the margins .... *P. confertus*

7. Plants glandular; leaves often toothed.

10. Ovaries and capsules glandular-hairy near the summit; calyces 7-13 mm long; corollas 20-40 mm long .... *P. eriantherus*

10. Ovaries and capsules smooth; calyces less than 7 mm long; corollas 12-25 mm long.

11. Stems arising singly or few together from short, underground stem-bases .... *P. gracilis*

11. Stems arising from above-ground, branched stem-bases.

12. Leaves entire or nearly so.

13. Calyces 7-11 mm long; corollas 18-30 mm long; capsules 6-10 mm long; sterile stamens bearded for more than half their length; plants of N BC .... *P. gormanii*

13. Calyces 3-6 mm long; corollas less than 20 mm long; capsules 5-7 mm long; sterile stamens bearded only at tips; plants of SE BC .... *P. albertinus*

12. Leaves generally toothed (often remotely so in *P. albertinus*).

14. Corollas 11-16 mm long; plants of SC and SE BC .... *P. pruinosus*

14. Corollas 15-23 mm long; plants of SE or SW BC.

15. Plants 40-100 cm tall; leaves sharply toothed, the larger ones more than 1.5 cm wide; plants from west of the Cascade Mtns .... *P. ovatus*

15. Plants usually less than 40 cm tall; leaves irregularly and obscurely toothed, the larger ones 0.5-2 cm wide; plants from SE BC .... *P. albertinus*

Penstemon albertinus Greene

Alberta penstemon

HABITAT/RANGE:

Dry open gravelly slopes, rocky ridges and forest margins in the montane to upper subalpine zones; infrequent in SE BC; E to SW AB and S to NW MT and C ID.

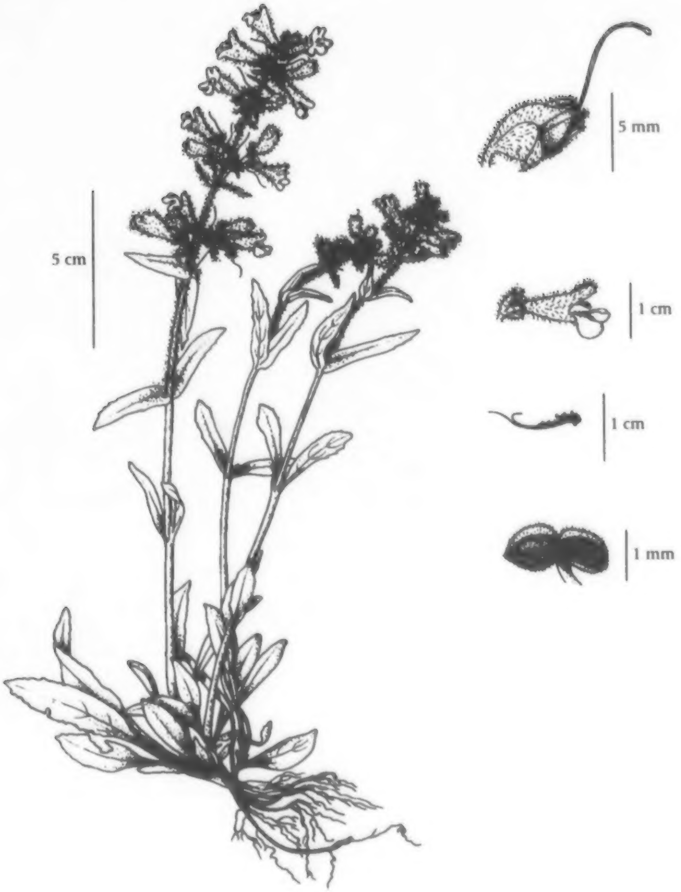
DESCRIPTION:

General: Perennial herb from a branching woody stem-base; stems several, clustered, ascending to erect, 10-40 cm tall, usually smooth below, glandular-hairy in the inflorescence.

Leaves: Opposite, irregularly and obscurely saw-toothed or entire, bright green, thick and firm, mostly smooth; basal leaves lanceolate to oval or spoon-shaped, 4-10 cm long, 0.5-2 cm wide, stalked; stem leaves well developed, lance-oblong, 2-5 cm long, unstalked.

Flowers: Inflorescence a leafy-braced, rather narrow, terminal cluster of 4 to 8 whorls of stalked flowers; corollas blue-violet to light blue, tubular, 1.2-2 cm long, hairy on the outside, hairy inside at the throat, 2-lipped, the lower lip a bit longer than the upper; calyces 3-6 mm long, somewhat glandular-hairy, 5-lobed, the lobes nearly distinct, broadly lanceolate to egg-shaped, slightly papery-margined, pointy-tipped; fertile stamens 4, the anthers smooth except for the often bristle-toothed sutures; sterile stamen golden-bearded for less than half its length toward the scarcely expanded tip.

Fruits: Capsules, 5-7 mm long; seeds numerous, 0.8-1.5 mm long.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1 mm

Penstemon albertinus

Penstemon confertus Dougl. *ex* Lindl.

yellow penstemon

HABITAT/RANGE:

Moist to dry meadows, grassy openings and open forests in the steppe and montane zones; frequent in S BC east of the Coast-Cascade Mountains; E to MB and S to MT, ID and OR.

DESCRIPTION:

General: Perennial herb from a woody stem-base, smooth throughout except for the flowers, or minutely hairy on the stems especially above; often with short leafy mat-forming stems at the base, the flowering stems usually several, clumped, ascending to erect but often decumbent-based, 10-50 cm tall, slender.

Leaves: Basal leaves stalked, lanceolate to spoon-shaped, 3-10 cm long, entire, occasionally poorly developed; stem leaves opposite, narrowly lanceolate, entire, unstalked, slightly smaller than the basal leaves.

Flowers: Inflorescence a slender terminal cluster, interrupted below, of 2 to 10 dense whorls of several stalked flowers, the bracts with papery and ragged margins; corollas narrowly tubular, 0.8-1.2 cm long, sulphur-yellow to yellowish-white, 2-lipped, smooth on the outside, hairy within at the throat; calyces 3-5 mm long, 5-lobed, the lobes lanceolate to oblong, abruptly long-pointy-tipped, the margins broad-papery and ragged; fertile stamens 4, the anthers smooth; sterile stamen about as long as the fertile stamens, brownish-bearded at its expanded tip.

Fruits: Capsules, 4-5 mm long; seeds numerous, 0.5-1 mm long.

Penstemon davidsonii Greene

Davidson's penstemon

HABITAT/RANGE:

Dry rock outcrops, slabs, ledges and talus slopes in the montane to alpine zones; frequent in BC in and west of the Coast-Cascade Mountains to 55° N, rare on the Queen Charlotte Islands; S to CA.

DESCRIPTION:

General: Low-shrubby perennial herb, woody at the base, with or without a taproot; stems much-branched, creeping, forming dense mats; flowering shoots 5-10 cm tall, minutely hairy.

Leaves: Opposite, evergreen, smooth but sometimes glandular-spotted, primary leaves short-stalked, thick and firm, the blades elliptic to circular, entire or minutely saw-toothed, 0.5-2 cm long, usually blunt-tipped; leaves of the flowering shoots few, unstalked, small, often bract-like, less than 1 cm long.

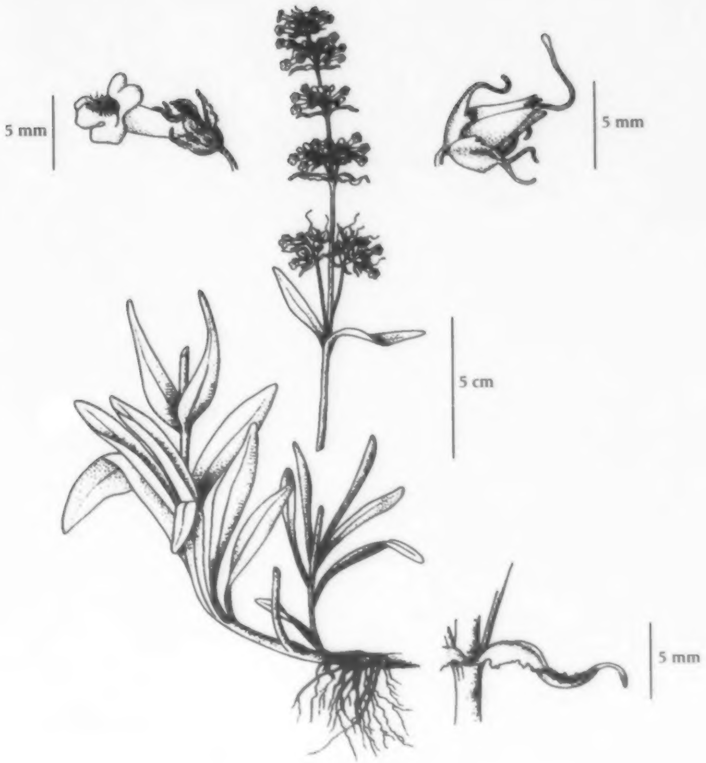
Flowers: Inflorescence a compact, few-flowered, terminal raceme, the bracts and stalks somewhat glandular-hairy; corollas purple to blue-lavender, tubular, 2-3.5 cm long, distinctly 2-lipped, smooth on the outside, hairy within on the lower lip near its base and on a pair of hairy ridges; calyces 7-10 mm long, smooth to thinly glandular-hairy, 5-lobed, the lobes lanceolate to narrowly egg-shaped; fertile stamens 4, the anthers densely white-woolly; sterile stamen half as long as the fertile stamens, long yellow-bearded toward the tip.

Fruits: Capsules, 8-11 mm long; seeds numerous, angled, narrowly winged, about 1.5 mm long.

Notes: Two sympatric, poorly defined (at least in BC) varieties occur in BC:

1. Leaves entire, tending to be broadest above the middle; infrequent .... var. *davidsonii*

1. Leaves minutely saw-toothed, tending to be broadest near or below the middle; the common variety .... var. *menziesii* (Keck) Cronq.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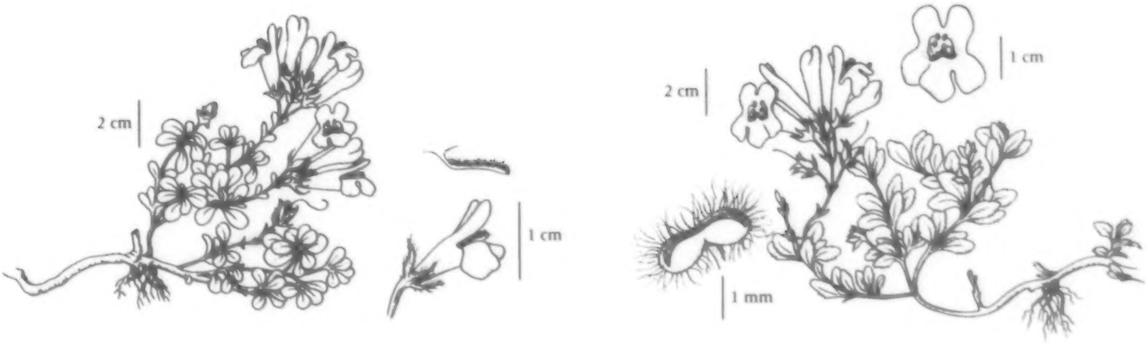
5 cm
5 mm

Penstemon confertus


2 cm
1 cm
2 cm
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var. *menziesii*

var. *davidsonii*

Penstemon davidsonii

Penstemon ellipticus **Coult. & Fisch.**

oval-leaved penstemon; elliptic-leaved penstemon

HABITAT/RANGE:

Dry rocky slopes, cliff crevices and ledges in the subalpine to alpine zones; infrequent in SE BC; E to SW AB and S to WY, N ID and WA.

DESCRIPTION:

General: Low-shrubby perennial herb, woody at the base, with or without a taproot; stems branched, creeping, forming rather loose mats; flowering shoots 5-15 cm tall, spreading-hairy.

Leaves: Opposite, evergreen, smooth, primary leaves short-stalked, thick and firm, the blades broadly elliptic to egg-shaped, entire or remotely toothed, 1-2.5 cm long, rounded to blunt-tipped; leaves of the flowering shoots few, unstalked or nearly so, egg-shaped, similar to the primary leaves but less crowded, usually at least 1 cm long.

Flowers: Inflorescence a compact, terminal raceme of 2 to 4 pairs of stalked flowers, the stalks glandular-hairy; corollas light purple to deep lavender, tubular, 2.5-4 cm long, distinctly 2-lipped, smooth on the outside, white-hairy within on the lower lip near its base and on a pair of ridges; calyces 8-15 mm long, minutely sticky-hairy, 5-lobed, the lobes lance-linear to narrowly oblong; fertile stamens 4, the anthers densely white-woolly; sterile stamen shorter than the fertile stamens, long yellow-bearded for much of its length.

Fruits: Capsules, 8-11 mm long; seeds numerous, angled, narrowly winged, 2-2.5 mm long.

Penstemon eriantherus **Pursh var. *eriantherus***

fuzzy-tongued penstemon

HABITAT/RANGE:

Dry open slopes and terraces in the steppe and montane zones; infrequent in SE BC; E to AB and S to NB, CO, ID and WA.

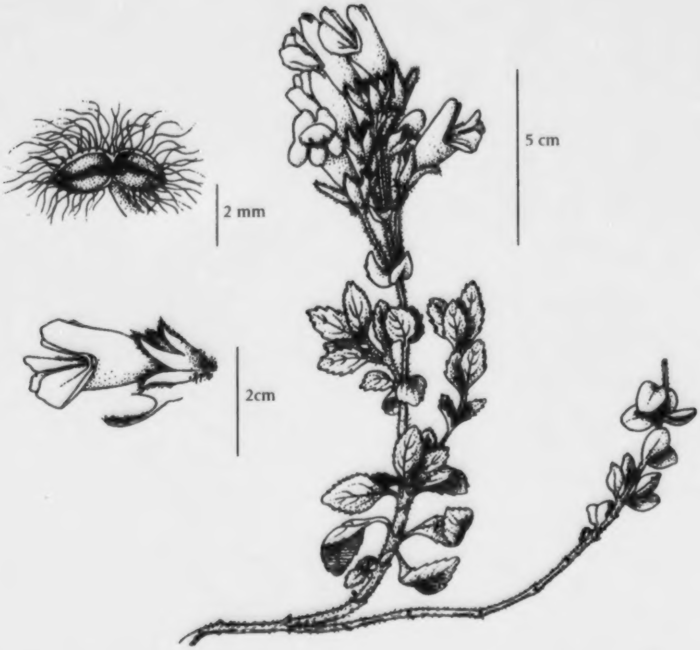
DESCRIPTION:

General: Perennial herb from a taproot surmounted by a frequently branched, largely underground stem-base; stems usually several, ascending to erect, 10-40 cm tall, minutely grey-hairy, sometimes also long-soft-hairy above and glandular-hairy in the inflorescence.

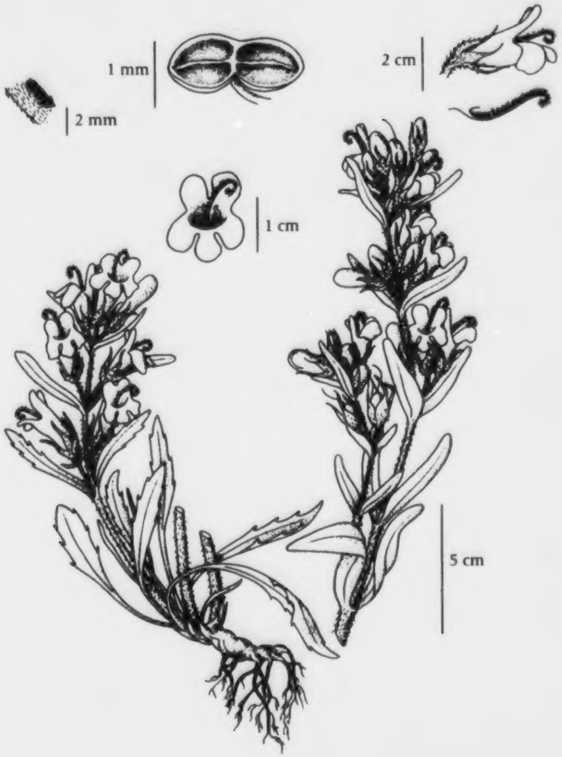
Leaves: Opposite, entire to remotely toothed; basal and lower leaves lanceolate to egg-shaped, stalked, to 13 cm long; upper leaves lanceolate to oblong, nearly unstalked, 3-7 cm long.

Flowers: Inflorescence a terminal cluster of several whorls of stalked flowers, the stalks glandular-hairy; corollas tubular, flaring at the mouth, (1.5) 2-4 cm long, pale lavender to blue-purple, lines of deeper colour within, strongly 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed, longer than the upper, strongly bearded in the throat; calyces 7-13 mm long, 5-lobed, the lobes lanceolate, long-tapering to a sharp tip, sticky-hairy; fertile stamens 4, the anthers essentially smooth; sterile stamen exserted, coiled at the tip, long yellow-bearded most of its length.

Fruits: Capsules, broadly oval, long-pointed, 6-12 mm long, glandular-hairy near the tip; seeds numerous, 2-3 mm long.



Penstemon ellipticus


1 mm
2 cm
2 mm
1 cm
5 cm

Penstemon eriantherus var. *eriantherus*

Penstemon fruticosus **(Pursh) Greene**

shrubby penstemon

HABITAT/RANGE:

Mesic to dry rocky hillsides and open forests in the steppe to alpine zones; common in S BC in and east of the Coast-Cascade Mountains and south of 53° N; S to MT, WY and OR.

DESCRIPTION:

General: Low shrubs or sub-shrubs, 15-40 cm tall; stems much-branched, ascending to erect, often reddish and brittle, smooth to minutely hairy on new growth and glandular-hairy in the inflorescence.

Leaves: Mostly opposite, more or less evergreen, smooth, primary leaves tending to be concentrated toward the base and on short sterile shoots, short-stalked, the blades linear to broadly lanceolate, toothed or entire, 1-6 cm long; leaves of the flowering shoots reduced and less crowded.

Flowers: Inflorescence a short, bracted, terminal raceme of a few pairs of stalked flowers, the stalks hairy; corollas blue-lavender to light purple, tubular, 2.5-5 cm long, distinctly 2-lipped, smooth on the outside, long-white-hairy within on the lower lip near its base and on a pair of ridges; calyces 7-15 mm long, hairy, 5-lobed, the lobes lance-linear to narrowly egg-shaped; fertile stamens 4, the anthers densely white-woolly; sterile stamen shorter than the fertile stamens, long-yellow-bearded toward the tip.

Fruits: Capsules, 8-12 mm long; seeds numerous, angled, narrowly winged, 1-2 mm long.

Notes: Two sympatric varieties occur in BC:

1. Leaves entire or slightly fine-toothed, relatively broad, 2-7 times as long as wide; corollas 2.5-4 cm long .... var. *fruticosus*

1. Leaves more or less toothed or sometimes entire, relatively narrow, 6-10 times as long as wide; corollas 3.5-5 cm long .... var. *scouleri* (Lindl.) Cronq.

Penstemon gormanii **Greene**

Gorman's penstemon

HABITAT/RANGE:

Dry rocky slopes, sand dunes, sandy or gravelly river terraces, clearings and cutbanks in the montane zone; rare in N BC; N to AK, YT and NT.

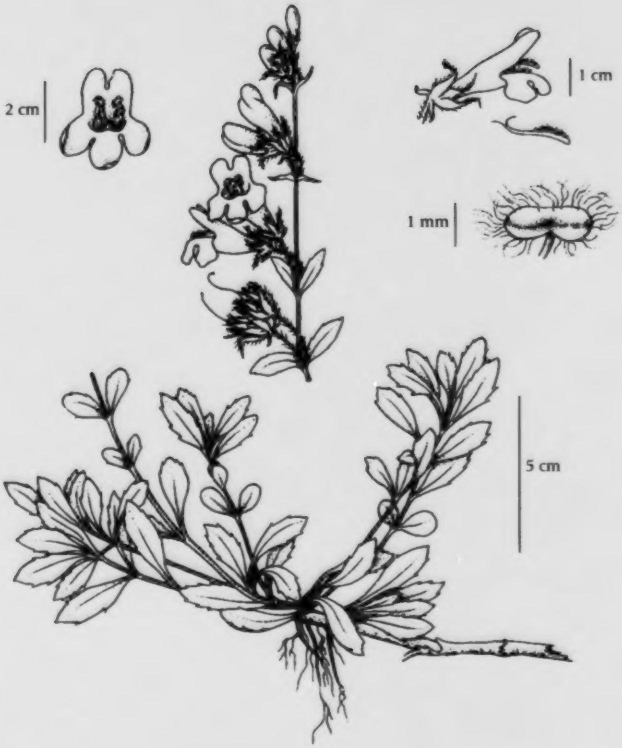
DESCRIPTION:

General: Perennial herb from a branching woody stem-base atop a taproot; stems several, tufted, ascending to erect, 10-50 cm tall, smooth below, hairy to glandular-hairy above especially in the inflorescence.

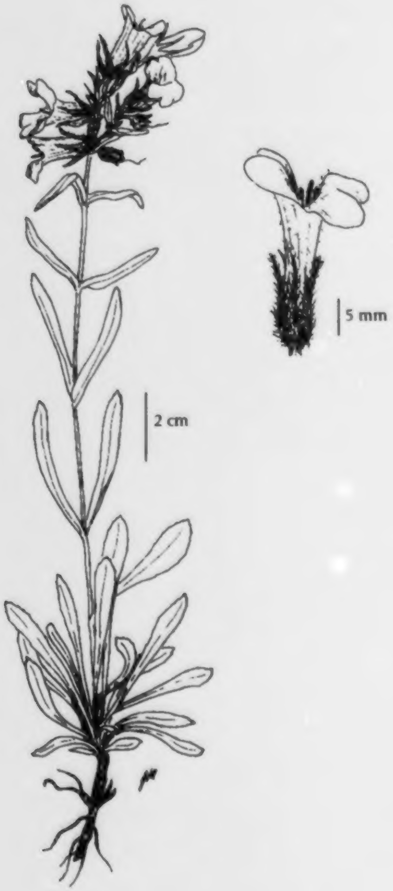
Leaves: Opposite, entire or obscurely toothed; basal leaves oblong-spoon-shaped and stalked, smooth; stem leaves narrowly lanceolate to oblong, unstalked, the upper leaves somewhat glandular-hairy.

Flowers: Inflorescence a leafy-bracted, terminal cluster of several whorls of stalked flowers; corollas pale violet to purplish or pinkish, rarely white, tubular, 2-3 cm long, 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed, the lobes hairy inside; calyces 7-11 mm long, densely hairy, 5-lobed, the lobes nearly distinct, lanceolate, pointy-tipped; fertile stamens 4, the anthers horseshoe-shaped, smooth; sterile stamen bearded more than half its length.

Fruits: Capsules, elliptic, abruptly long pointy-tipped, 6-10 mm long; seeds numerous.


2 cm
1 cm
1 mm
5 cm

Penstemon fruticosus



Penstemon gormanii

***Penstemon gracilis* Nutt.**
slender penstemon

Habitat/Range:

Dry to moist, sandy or rocky grasslands; rare in NE BC, known only from the Peace River area; E to ON and S to IN, IL, NE and NM.

Description:

General: Perennial herb from a short, unbranched, underground stem-base; stems 1 to few, clumped, ascending to erect, 15-40 cm tall, glandular-hairy in the inflorescence, otherwise smooth or minutely hairy below.

Leaves: Basal and lowermost stem leaves short-stalked, lanceolate or elliptic, to 12 cm long, often with scattered short teeth, sometimes poorly developed and usually soon withering; stem leaves opposite, unstalked or nearly so, linear-lanceolate, 2-10 cm long, mostly minutely toothed, smooth.

Flowers: Inflorescence a terminal, relatively slender cluster of several whorls of few stalked flowers, the stalks glandular-hairy; corollas tubular, 1.5-2.3 cm long, lilac or whitish, strongly 2-lipped, glandular-hairy on the outside, hairy at the throat and whitish within; calyces 4-7 mm long, 5-lobed, the lobes lanceolate to egg-shaped, with or without papery margins, glandular-hairy; fertile stamens 4, the anthers smooth except for the minutely bristle-toothed sutures; sterile stamen gradually expanded toward the tip, yellow-bearded for much of its length.

Fruits: Capsules, 4-8 mm long; seeds numerous, less than 1 mm long.

***Penstemon lyallii* (A. Gray) A. Gray**
Lyall's penstemon

Habitat/Range:

Dry to mesic rocky slopes, gravel bars and shale slides in the montane zone; rare in extreme SE BC; E to SW AB and S to N MT and N ID.

Description:

General: Perennial herb from a stout taproot surmounted by a branched, sometimes woody stem-base; stems usually several, clumped, ascending to erect, 30-80 cm tall, glandular-hairy in the inflorescence, smooth or minutely hairy in lines below.

Leaves: Opposite, lanceolate to linear-lanceolate, toothed to nearly entire, unstalked or nearly so, 3-13 cm long, smooth or grey-short-hairy; lowermost leaves reduced.

Flowers: Inflorescence a terminal panicle of several groups of 2 to several stalked flowers, the stalks glandular-hairy; corollas tubular, 3-4.5 cm long, lavender to pale purple, strongly 2-lipped, smooth on the outside, long-woolly within along the ridges of the lower lip, which is not much longer than the upper; calyces 7-15 mm long, 5-lobed, the lobes lanceolate, long-tapering to a sharp tip, entire, glandular-hairy; fertile stamens 4, the anthers densely long-woolly; sterile stamen usually shorter than the fertile stamens, smooth.

Fruits: Capsules, 10-14 mm long; seeds numerous, angled, 1-2 mm long.

Penstemon nitidus* Dougl. *ex* Benth. var. *nitidus
shining penstemon

Habitat/Range:

Dry hillsides, grasslands and roadside banks in the montane zone; rare in extreme SE BC, known only from Crowsnest Pass; E to SK and S to ND and CO.

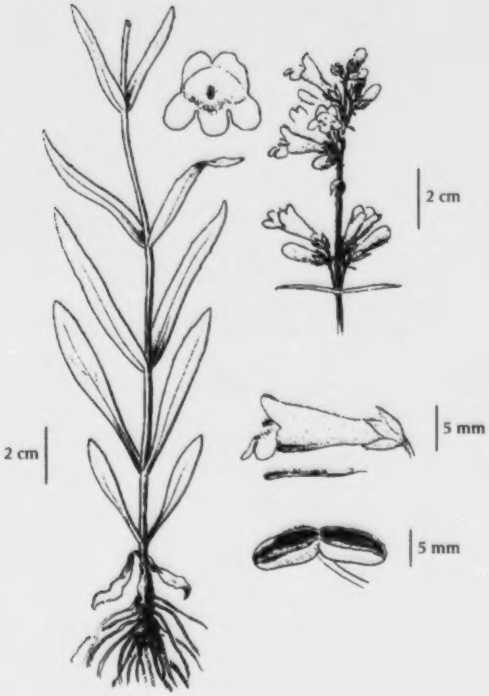
Description:

General: Perennial herb from a short, branched, underground stem-base, smooth throughout; stems usually several, clumped, ascending to erect, 10-30 cm tall, stout.

Leaves: Thick and firm, glaucous, entire; basal leaves stalked, tufted, broadly lanceolate, 3-10 cm long; stem leaves opposite, lanceolate to egg-shaped, unstalked, shorter than basal leaves.

Flowers: Inflorescence a terminal bracted cluster, compact and spike-like or interrupted below, of several dense whorls of stalked flowers, the bracts large, leaflike, abruptly long-pointed; corollas tubular, 1.3-1.8 cm long, bright blue, rarely pinkish or purplish, 2-lipped, smooth on the outside and the inside; calyces 3-6 mm long, 5-lobed, the lobes lanceolate, entire; fertile stamens 4, the anthers smooth; sterile stamen shortly exserted, prominently yellow-bearded for 2-4 mm toward its expanded tip.

Fruits: Capsules, 9-12 mm long; seeds about 3 mm long.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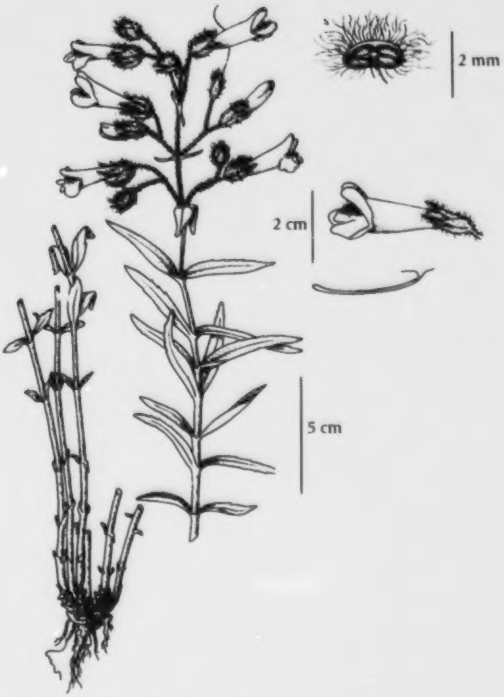
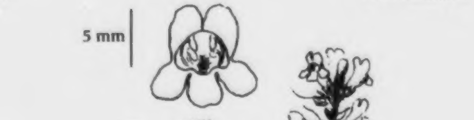
Penstemon gracilis



Penstemon lyallii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Penstemon nitidus var. *nitidus*

***Penstemon ovatus* Dougl. *ex* Hook.**

broad-leaved penstemon

HABITAT/RANGE:

Dry to mesic open forests, rocky outcrops and mossy ledges in the lowland and montane zones; infrequent on S Vancouver Island and the Lower Fraser Valley; S to N OR.

DESCRIPTION:

General: Perennial herb from a woody stem-base; stems several, clustered, ascending to erect, 30-100 cm tall, usually smooth below, spreading-coarse-hairy in the inflorescence.

Leaves: Opposite, distinctly saw-toothed, bright green, spreading-hairy especially along the midrib beneath or nearly smooth; basal leaves egg-shaped to broadly lanceolate, 6-16 cm long, 2-5 cm wide, stalked, the stalks about as long as the blades; stem leaves well developed, almost as long as the basal leaves, more triangular egg-shaped above, unstalked, clasping-based.

Flowers: Inflorescence a leafy-bracted, rather open, terminal cluster of several whorls of stalked flowers; corollas deep blue, tubular, 1.5-2.2 cm long, 2-lipped, the lower lip longer than the upper lip, glandular-hairy on the outside, hairy inside at the throat; calyces 3-5 mm long, somewhat glandular-hairy, 5-lobed, the lobes nearly distinct, lanceolate to narrowly egg-shaped, slightly papery-margined if at all, pointy-tipped; fertile stamens 4, the anthers smooth except for the often bristle-toothed sutures; sterile stamen bearded toward the scarcely expanded, curved tip.

Fruits: Capsules, 4-6 mm long; seeds numerous, 1-1.5 mm long.

***Penstemon procerus* Dougl. *ex* Graham**

small-flowered penstemon; slender blue penstemon

HABITAT/RANGE:

Dry to mesic meadows, grassy hillsides, rocky slopes, sandy banks, gravelly ridges and terraces, and open forests in the montane to alpine zones; common throughout BC, except the coast; var. procerus – N to AK and YT, E to SK and S to CO, UT, ID and OR; var. *tolmei* – S to WA.

DESCRIPTION:

General: Perennial herb from a superficial, woody stem-base, smooth throughout except for the flowers; often with short leafy mat-forming stems at the base, the flowering stems usually several, clumped, ascending to erect but often decumbent-based, (5) 10-40 cm tall, slender.

Leaves: Basal leaves stalked, lanceolate to spoon-shaped, 3-10 cm long, entire, sometimes poorly developed; stem leaves few, opposite, lanceolate, entire, unstalked, smaller than the basal leaves.

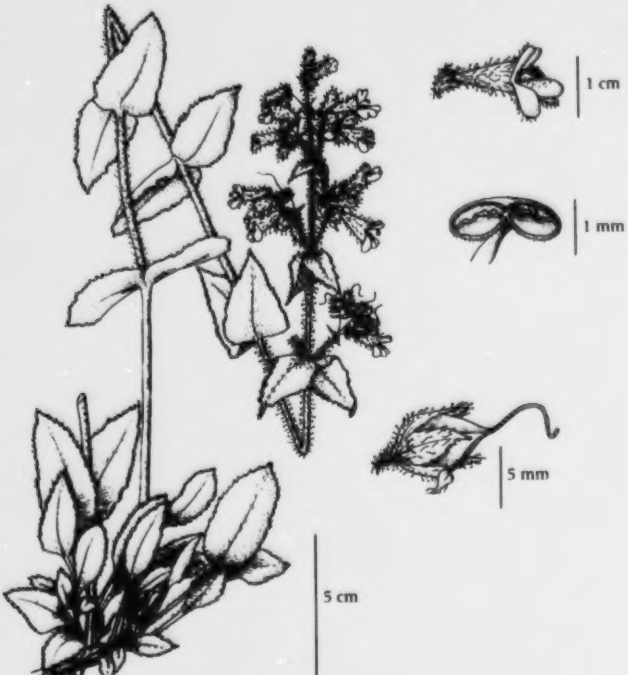
Flowers: Inflorescence a slender terminal cluster, compact and spike-like or interrupted below, of 1 to several dense whorls of several stalked flowers, the bracts entire; corollas narrowly tubular, 0.6-1.2 cm long, deep purple-blue but occasionally pinkish or yellowish-white, 2-lipped, smooth on the outside, hairy within at the throat; calyces 3-6 mm long, 5-lobed, the lobes oblong to egg-shaped, gradually tapering to a sharp tip or abruptly sharp-pointed, minutely hairy, the margins often papery and ragged at least near the base; fertile stamens 4, the anthers smooth; sterile stamen about as long as the fertile stamens, yellow-bearded at its expanded tip.

Fruits: Capsules, 3-5 mm long; seeds numerous, 0.5-1 mm long.

Notes: Two varieties occur in BC:

1. **Basal rosettes poorly developed; plants mostly 20-40 cm tall, usually with more than 1 whorl of flowers per stem; throughout range of the species .... var. *procerus***

1. **Basal rosettes well developed; plants mostly 5-15 cm tall, usually with only 1 whorl of flowers per stem; SC BC, largely in the Cascade Mtns .... var. *tolmiei* (Hook.) Cronq.**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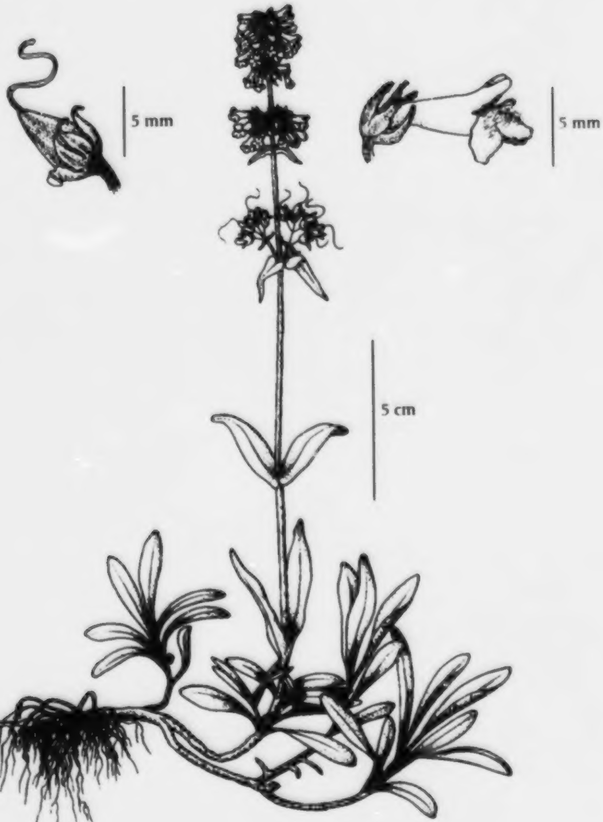
Penstemon ovatus



Penstemon procerus

Penstemon pruinosus **Dougl. *ex* Lindl.**

Chelan penstemon

HABITAT/RANGE:

Dry sagebrush hillsides, grassy slopes, and open forests in the steppe and montane zones; infrequent in S BC east of the Coast-Cascade Mountains; S to N WA.

DESCRIPTION:

General: Perennial herb from a stout, branched, woody stem-base; stems several, clustered, ascending to erect, 10-40 cm tall, minutely sticky-hairy to merely short-hairy to smooth below, glandular-hairy in the inflorescence.

Leaves: Opposite, usually distinctly saw-toothed, minutely sticky-hairy, sometimes greyish beneath, or rarely essentially smooth; basal leaves egg-shaped to lanceolate, 5-10 (15) cm long, 0.5-2 (3) cm wide, stalked, the stalks about as long as the blades; stem leaves well developed, 1.5-6 cm long, triangular-egg-shaped to lanceolate, mostly unstalked.

Flowers: Inflorescence a leafy-bracted, rather narrow, terminal cluster of several compact whorls of stalked flowers; corollas deep blue, tubular, 1-1.6 cm long, 2-lipped, the lower lip larger than the upper, glandular-hairy on the outside, hairy inside at the throat; calyces 3-6 mm long, somewhat glandular-hairy, 5-lobed, the lobes nearly distinct, lanceolate to narrowly egg-shaped, slightly papery-margined, pointy-tipped; fertile stamens 4, the anthers smooth; sterile stamen bearded toward the scarcely expanded tip.

Fruits: Capsules, 5-7 mm long, smooth or thinly short glandular-hairy; seeds numerous, about 1 mm long.

Penstemon richardsonii **Dougl. *ex* Lindl. var. *richardsonii***

Richardson's penstemon

HABITAT/RANGE:

Dry rocky or gravelly hillsides and roadcuts in the steppe zone; infrequent in SC BC; S to OR.

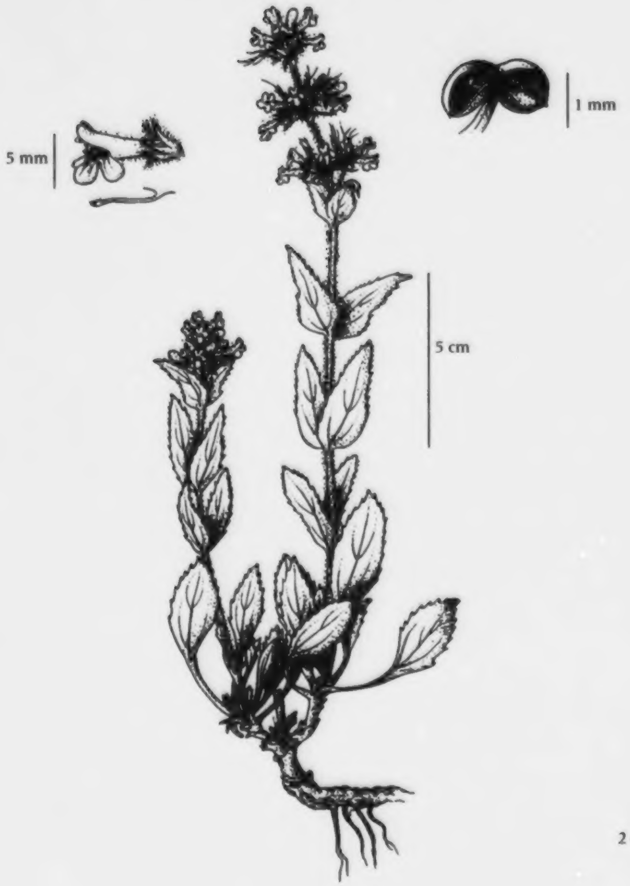
DESCRIPTION:

General: Perennial herb, shrubby at the base, from a stout taproot; stems usually numerous, erect, 20-80 cm tall, brittle, minutely hairy and also glandular-hairy in the inflorescence.

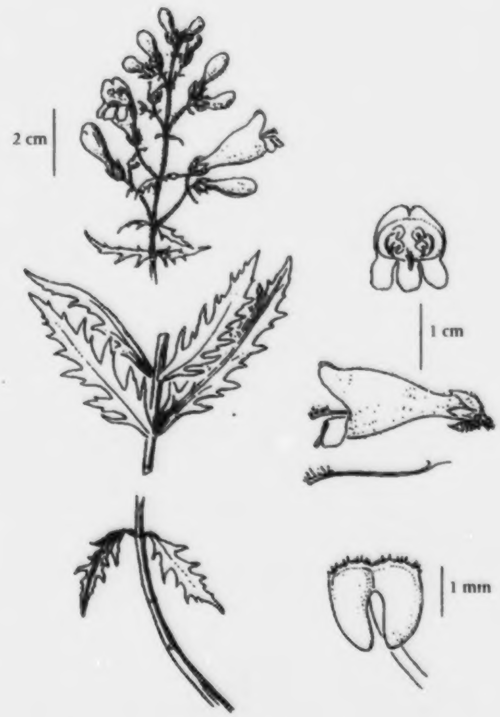
Leaves: Opposite, unstalked or the lower short-stalked, lance-oblong, jaggedly toothed to irregularly pinnately cleft, to 7 cm long, smooth to minutely frosty-hairy on the upper surface.

Flowers: Inflorescence a narrow terminal raceme or open branched panicle, of several to many short-stalked flowers; corollas magenta to rose-pink, tubular, 2-3.5 cm long, glandular-hairy on the outside, smooth within or with a few, long white hairs near the mouth, distinctly 2-lipped, the lower lip striped within; calyces 4-9 mm long, 5-lobed, the lobes lanceolate to egg-shaped, green or bluish, usually unequal and entire; fertile stamens 4, the anthers horseshoe-shaped, fringed with hairs on the sutures; sterile stamen short-exserted, long-bearded at its scarcely expanded tip.

Fruits: Capsules, 5-8 mm long; seeds numerous, about 1 mm long.



Penstemon pruinosus



Penstemon richardsonii var. *richardsonii*

Penstemon serrulatus **Menzies *ex* Sm.**

coast penstemon

HABITAT/RANGE:

Streambanks and moist gullies and rocky slopes in the lowland to lower subalpine zones; frequent in W BC south of 56° N, except absent from the Queen Charlotte Islands, rare E of Coast-Cascade Mountains; S to OR.

DESCRIPTION:

General: Perennial herb from a branching, woody stem-base; stems several to many, tufted, ascending to erect, 20-70 cm tall, somewhat woody at the base, smooth below, usually minutely hairy above especially in the inflorescence, but not glandular.

Leaves: Opposite, unstalked or short-stalked on vigorous shoots, broadly lanceolate to elliptic or oblong-egg-shaped, 2-9 cm long, saw-toothed to jagged-toothed or sometimes nearly entire, often wavy-edged, essentially smooth; upper leaves sometimes clasping-based.

Flowers: Inflorescence terminal, of 1 to 5 whorled clusters of stalked flowers, the lower whorls often open, the upper compact; corollas deep blue to purple, tubular, 1.5-2.5 cm long, smooth inside and out or sometimes hairy within at base of lower lip, 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed, the lobes smooth; calyces 5-9 mm long, 5-lobed, the lobes fringed with hairs and sometimes irregularly cleft; fertile stamens 4, the anthers smooth except for a hairy fringe along the sutures; sterile stamen yellow-bearded on the upper half.

Fruits: Capsules, 5-8 mm long, usually slightly exceeding the appressed calyx lobes; seeds numerous, 1-1.5 mm long.

RHINANTHUS

Rhinanthus minor **L.** (*R. borealis* [Stern.] Chab. ssp. *kyrolliae* [Chab.] Pennell, *R. crista-galli* L., *R. groenlandicus* (Ostenf.) Chabert, *R. stenophyllus* [Schur] Schinz & Thell.)

yellow rattle

HABITAT/RANGE:

Mesic to moist meadows, fields, pastures, roadsides and clearings in the lowland, steppe and montane zones; frequent in BC south of 56° N, rare northward and on the Queen Charlotte Islands; circumboreal, N to AK, YT and NT, E to Labr. and NF and S to NH, VT, ND, NM, AZ and OR; Greenland, Eurasia.

DESCRIPTION:

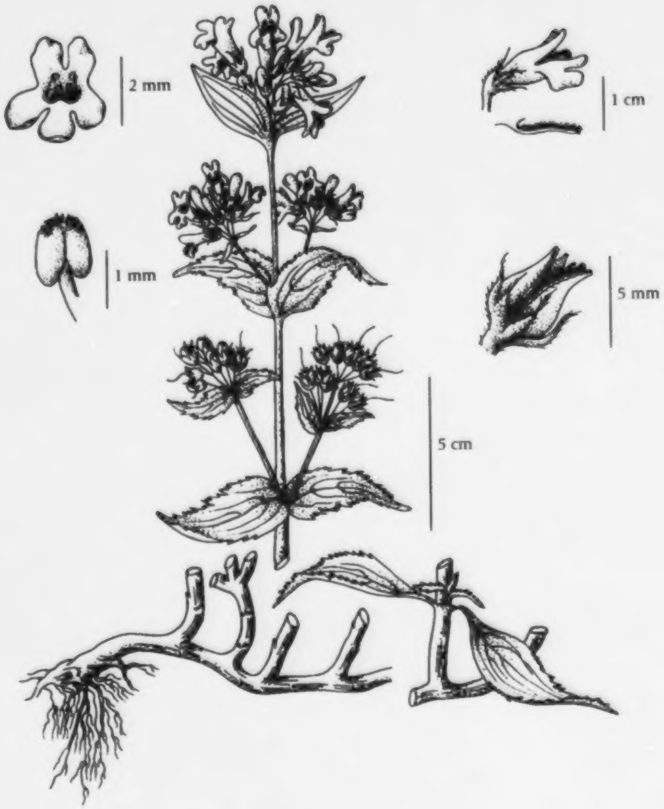
General: Annual herb; stems erect, 10-80 cm tall, simple or few-branched, somewhat 4-angled, nearly smooth to thinly soft-hairy at the nodes and in lines down opposite 2 of the 4 sides.

Leaves: Opposite, unstalked, lanceolate to oblong, 1-5 cm long, prominently toothed, rough appressed-hairy.

Flowers: Inflorescence a leafy-bracted, terminal, spike-like cluster of several to many, nearly unstalked flowers; corollas yellow, tubular, 10-15 mm long, 2-lipped, the upper lip hood-like and usually with a pair of short, broad, often purplish teeth near the tip, the lower lip 3-lobed; calyces membranous, 7-10 mm long in flower, to 12-17 mm and much inflated in fruit, like a flattened net-veined balloon, 4-toothed, the teeth fine-hairy; stamens 4, the anthers hairy.

Fruits: Capsules, nearly globe-shaped, flattened, 8-15 mm long, enveloped by the calyx-balloon; seeds several, large, 3-6 mm in diameter, flat, narrow-winged.

Notes: A murky species complex but it appears that in BC only 1 entity is present.


2 mm
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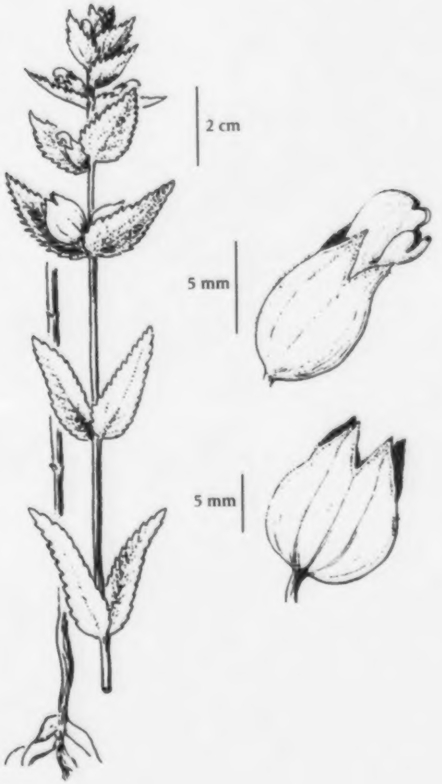
5 mm
5 cm

Penstemon serrulatus



Rhinanthus minor

SCROPHULARIA[7]

1. Sterile stamens purple or brown, mostly 0.5-1 mm wide and slightly longer than wide; corollas dark maroon, at least on the upper lip .... *S. californica*

1. Sterile stamens yellow-green, generally 1-1.8 mm wide and slightly wider than long; corollas yellowish-green with a light maroon overcast, especially above .... *S. lanceolata*

Scrophularia californica **Cham. & Schlecht. var.** ***oregana*** **(Pennell) Boivin** (*S. oregana* Pennell)
California figwort

HABITAT/RANGE:

Moist streambanks, shores, thickets, clearings, roadsides, and forest openings in the lowland zone; locally frequent on Vancouver Island and the Gulf Islands; S to OR.

DESCRIPTION:

General: Perennial herb from thickened roots; stems erect, 50-120 cm tall, 4-angled, minutely glandular-hairy.

Leaves: Opposite, stalked, the stalks 3-6 cm long, the blades egg-shaped to more or less triangular, 7-17 cm long, coarsely single- to double-toothed.

Flowers: Inflorescence a long, open, branched, terminal cluster of stalked flowers; corollas short-tubular, 8-13 mm long, the upper half brown to maroon, the lower half paler or yellowish-green, 2-lipped, the upper lip pointing forward, 2-lobed, the lower lip shorter, 3-lobed, the middle lobe pointing down; calyces 3-4 mm long, 5-lobed, the lobes oblong to egg-shaped, blunt; fertile stamens 4, sterile stamen 1, attached near the base of the upper lip, brown to purple, broadened toward the tip, club- to egg-shaped, slightly longer than wide.

Fruits: Capsules, pear-shaped, 6-8 mm long; seeds numerous, oblong egg-shaped, angular, ridged.

Notes: Easily confused with *S. lanceolata*.

Scrophularia lanceolata **Pursh**
lance-leaved figwort

HABITAT/RANGE:

Moist to mesic roadsides, clearings, thickets and forest edges in the lowland and steppe zones; rare on Vancouver Island and in SC BC; E to PQ and NS and S to VT, PA, NC, IN, IO, OK, NM, UT, NV and CA.

DESCRIPTION:

General: Perennial herb from thickened roots; stems erect, 80-150 cm tall, clustered, 4-angled, minutely glandular-hairy.

Leaves: Opposite, stalked, the stalks 1-4 cm long, the blades egg-shaped to lance-triangular, 5-15 cm long, coarsely single- to double-sawtoothed.

Flowers: Inflorescence a long, narrow branched, terminal cluster of stalked flowers, the stalks glandular-hairy, corollas 8-14 mm long, yellowish-green to greenish-brown, urn-shaped, 2-lipped, the upper lip pointing forward, 2-lobed, the lower lip shorter, 3-lobed, the middle lobe pointing down; calyces 3-4 mm long, 5-lobed, the lobes egg-shaped, rounded; fertile stamens 4, sterile stamen 1, attached near the base of the upper lip, yellow-green, fan-shaped, wider than long.

Fruits: Capsules, pear-shaped, 6-8 mm long; seeds numerous, oblong egg-shaped, angular, ridged.

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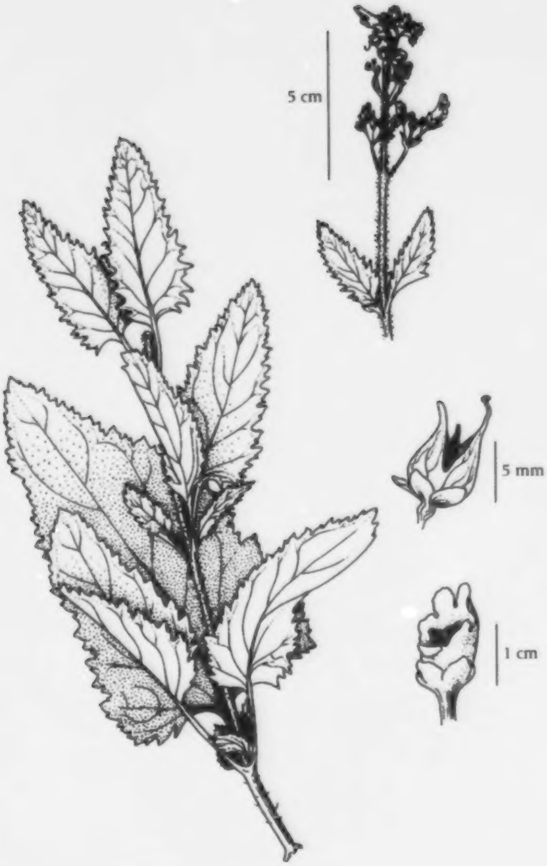
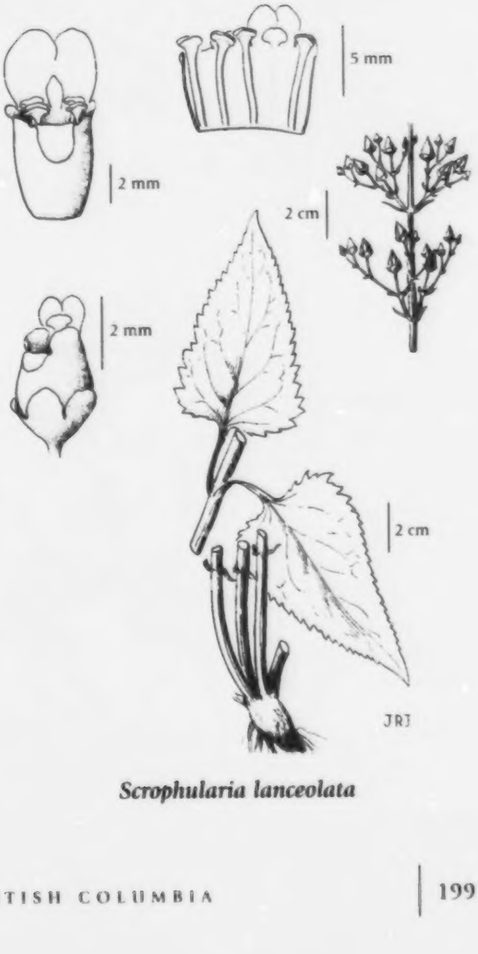
[7] Key adapted from Hitchcock & Cronquist (1973).



Scrophularia californica var. *oregana*


5 mm
2 mm
2 cm
2 mm
2 cm
JRJ

Scrophularia lanceolata

TONELLA

Tonella tenella **(Benth.) Heller**

small-flowered tonella

HABITAT/RANGE:

Dry, rocky slopes in the lowland zone; rare in SW BC, known only from Saltspring Island; S to CA.

DESCRIPTION:

General: Annual herb from a taproot; stems ascending to erect, 5-25 cm tall, slender, often branched, smooth.

Leaves: Opposite, smooth or soft-hairy on the upper surface; lowermost leaves stalked, egg-shaped to round, 1-2 cm long, few-toothed; middle and upper leaves becoming unstalked upward, deeply 3-lobed, the segments progressively narrower upward; uppermost leaves reduced and often entire.

Flowers: Inflorescence of 1 to several long-stalked flowers in the axils of bracts, the stalks smooth or minutely glandular-hairy; corollas blue and white, short-tubular, 2-4 mm wide, 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed, the middle lobe largest; calyces to 3 mm long, deeply 5-lobed, the lobes longer than the tube; stamens 4, exserted.

Fruits: Capsules, egg- to globe-shaped; seeds 2 to 4, large, 1-1.5 mm long, wingless.

TRIPHYSARIA

1. Stamens slightly exserted from the upper lip; corollas 4-6 mm long .... *T. pusilla*

1. Stamens not exserted from the upper lip; corollas 12-22 mm long .... *T. versicolor*

Triphysaria pusilla **(Benth.) Chuang & Heckard (*Orthocarpus pusillus* Benth.)**

dwarf owl-clover

HABITAT/RANGE:

Vernally moist, open, grassy sites in the lowland zone; locally frequent on S Vancouver Island and the Gulf Islands, rare on the adjacent mainland; S to CA.

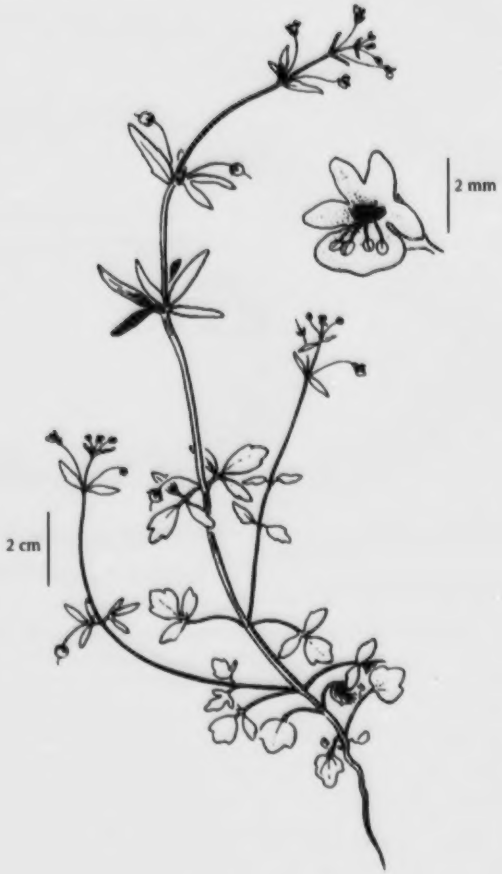
DESCRIPTION:

General: Annual herb, finely stiff-spreading-hairy throughout, usually maroon or purplish; stems decumbent, usually with ascending branches from the base, 5-20 cm tall, very slender; main axis obscure.

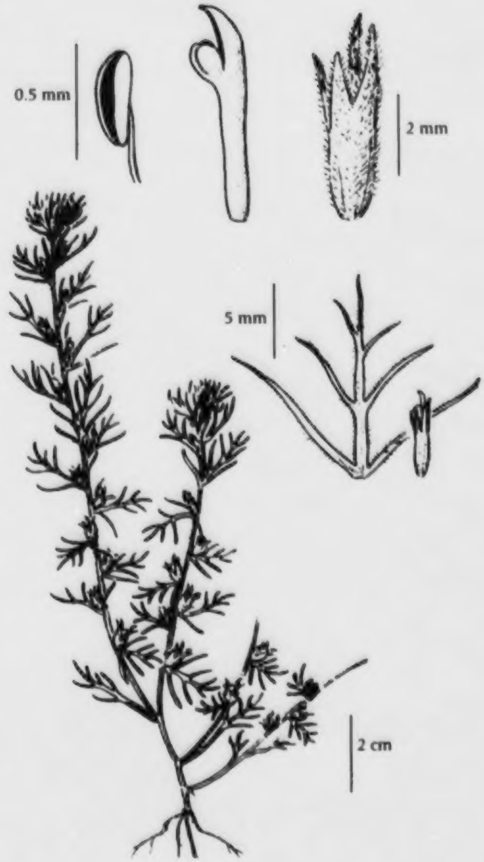
Leaves: Alternate, unstalked, linear, 0.5-3 cm long, pinnately divided into 3 to 9 thread-like lobes.

Flowers: Inflorescence a loose, ultimately elongate, prominently bracted, terminal spike 4-15 cm long, often extending to near the base of the stem, the bracts 5-12 mm long, resembling the leaves but more dissected, pinnately divided into 3 to 11 lobes; corollas red-purple, occasionally yellowish, inconspicuous, smooth or nearly so, 4-6 mm long, narrowly tubular not club-shaped, 2-lipped, the upper lip beaked and hooked, longer than the lower lip, the lower lip swollen, 3-pouched, inconspicuously 3-toothed; calyces tubular, 5-7 mm long, hairy, 4-lobed, becoming papery in fruit; stamens 4, slightly exserted.

Fruits: Capsules, round, flattened, 4-6 mm long; seeds 20 to 30, about 1 mm long, with a tight-fitting, netted coat.



Tonella tenella


0.5 mm
2 mm
5 mm
2 cm

Triphysaria pusilla

Triphysaria versicolor **Fisch. & C. Meyer ssp.** ***versicolor*** (*Orthocarpus faucibarbatus* A. Gray ssp. *albidus* Keck)
bearded owl-clover

HABITAT/RANGE:

Vernally moist to dry grassy meadows on headlands near the sea in the lowland zone; rare on SE Vancouver Island; disjunct, S OR to N CA.

DESCRIPTION:

General: Annual herb; stems erect, 10-50 cm tall, slender, simple or branched above, smooth except short-hairy in the inflorescence, straw-coloured.

Leaves: Alternate, unstalked, linear-lanceolate, 2-8 cm long, pinnately divided into 5 to 9 linear lobes, smooth.

Flowers: Inflorescence a dense, ultimately elongate, prominently bracted, terminal spike 5-20 cm long, the bracts 8-18 mm long, differing gradually from the leaves, divided into 3 to 5 lanceolate lobes; corollas whitish often fading pinkish, much exserted, densely short-hairy, 12-22 mm long, tubular, club-shaped, 2-lipped, the upper lip beaked, slightly longer than the lower lip, the lower lip swollen, deeply 3-pouched, minutely 3-toothed, the margins purple-dotted; calyces tubular, 5-10 mm long, hairy, 4-lobed; stamens 4, included within the corolla.

Fruits: Capsules, ellipsoid, 6-9 mm long; seeds numerous, about 1 mm long, with a tight-fitting, netted coat.

Notes: This disjunct species occurs 425 km N of the nearest population in Lane Co., OR. Most authors (e.g., Keck 1927, Taylor and MacBryde 1977, Scoggan 1979) have treated this as an introduced species although there is no evidence of introduction at the collection sites.

VERBASCUM

1. Plants more or less densely stalked-glandular upward, essentially smooth below; leaves green .... *V. blattaria*
1. Plants woolly throughout with branched, non-glandular hairs; leaves greyish.
   2. Inflorescences loose, often branching at the base; leaves unstalked, not decurrent on the stem or only slightly so; plants loosely woolly .... *V. phlomoides*
   2. Inflorescences dense, simple; leaves stalked, at least below, decurrent on the stem, usually as far as the next leaf below; plants densely woolly .... *V. thapsus*

Verbascum blattaria **L.**
moth mullein

HABITAT/RANGE:

Mesic to moist roadsides, fields and waste places; rare in SW and SC BC; introduced from Eurasia.

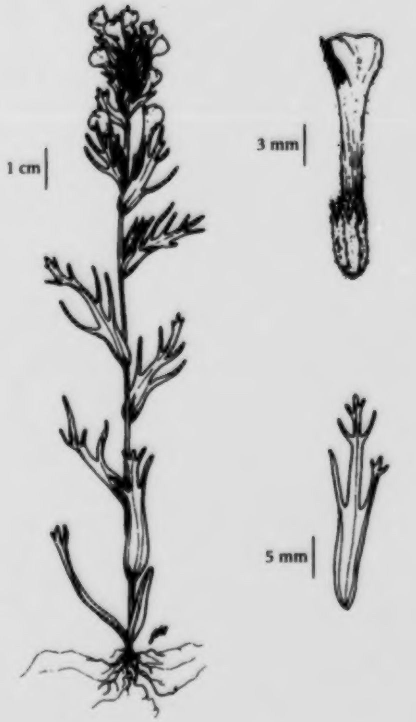
DESCRIPTION:

General: Biennial herb from a taproot; stems single, erect, 0.5-1.5 m tall, angled, stalked-glandular upward especially in the inflorescence, smooth below.

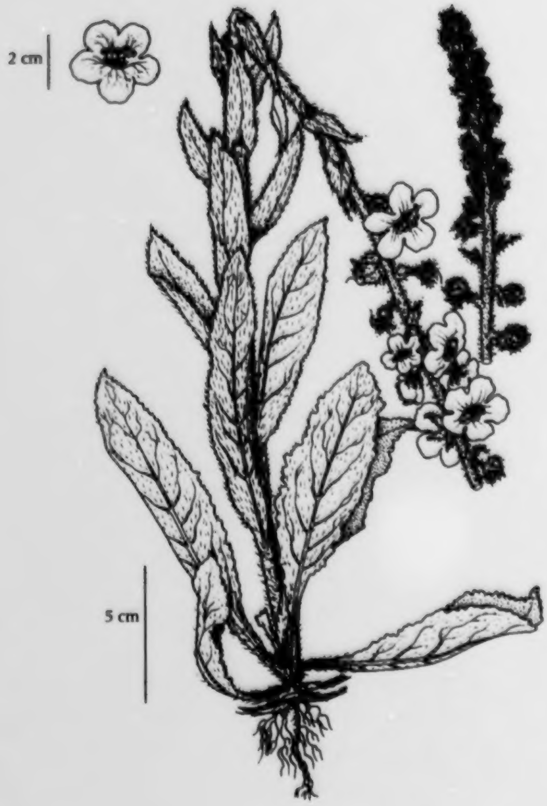
Leaves: Basal leaves in a rosette, broadly lanceolate to oblong, 5-25 cm long, tapering to a short-stalked base, coarsely toothed and sometimes also wavy-lobed; stem leaves numerous, alternate, progressively reduced upward, becoming unstalked, with clasping leaf-bases, the margins with sharp triangular teeth.

Flowers: Inflorescence a rather open, bracted, spike-like, terminal cluster, occasionally with additional axillary clusters, of numerous stalked flowers, the stalks 8-15 mm long; corollas yellow or less commonly whitish, wheel-shaped, 2-3 cm across, 5-lobed, the lobes nearly equal, the tube very short; calyces glandular-hairy, much shorter than the flower stalks, deeply 5-lobed, the lobes narrowly elliptic; stamens 5, the filaments covered with purple-knobbed hairs.

Fruits: Capsules, nearly globe-shaped, 6-8 mm long; seeds numerous, longitudinally ridged.



Triphysaria versicolor* ssp. *versicolor



Verbascum blattaria

***Verbascum phlomoides* L.**

woolly mullein; clasping mullein

HABITAT/RANGE:

Mesic to moist roadsides, fields and waste places; rare in SW BC (Gulf Islands and adjacent mainland) and SC BC (Kelowna); introduced from Eurasia.

DESCRIPTION:

General: Stout biennial herb from a taproot; stems single, erect, 0.3-1.2 m tall, white- to yellowish-woolly.

Leaves: Basal leaves in a rosette, oblong-elliptic, tapering to a stalked base, round-toothed, woolly on both surfaces; stem leaves numerous, alternate, progressively reduced and more lanceolate upward, smooth above, woolly beneath, becoming unstalked and entire, with clasping leaf-bases not or slightly decurrent along the stem.

Flowers: Inflorescence a bracted, spike-like, terminal cluster, at first dense later elongating and spacing-out some of the numerous, very short-stalked flowers; corollas yellow to orange-yellow, sometimes white, wheel-shaped, 2-5 cm across, 5-lobed, the lobes nearly equal, concave, the tube very short; calyces 5-12 mm long, longer than the flower stalks, hairy, deeply 5-lobed, the lobes lanceolate; stamens 5, the 3 upper filaments densely, long, white-hairy, the 2 lower filaments smooth or nearly so.

Fruits: Capsules, ellipsoid to egg-shaped, 5-8 mm long; seeds numerous.

***Verbascum thapsus* L.**

great mullein; common mullein

HABITAT/RANGE:

Dry roadsides, gravel pits, fields and waste places; common in S BC north to 53° N, rare north to 55° N; introduced from Eurasia.

DESCRIPTION:

General: Robust biennial herb from a taproot; stems single, erect, 0.5-2 m tall; stem, leaves and inflorescence densely woolly with star-shaped or forking-branched, felted hairs.

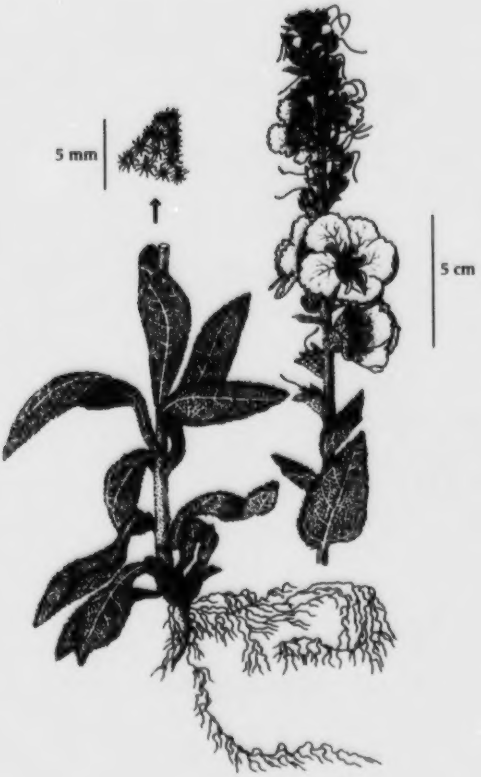
Leaves: Basal leaves in a rosette, broadly lanceolate, 10-45 cm long, tapering to a stalked base, vaguely round-toothed to entire; stem leaves numerous, alternate, progressively reduced upward, becoming unstalked, with clasping leaf-bases decurrent along the stem.

Flowers: Inflorescence a dense, bracted, spike-like, terminal cluster, 10-50 cm long, of numerous very short-stalked flowers; corollas yellow, wheel-shaped, 1.5-3 cm across, 5-lobed, the lobes nearly equal, concave, the tube very short; calyces 5-12 mm long, hairy, deeply 5-lobed, the lobes lanceolate; stamens 5, the 3 upper filaments white- or yellow-long-hairy, the 2 lower filaments longer, smooth or nearly so.

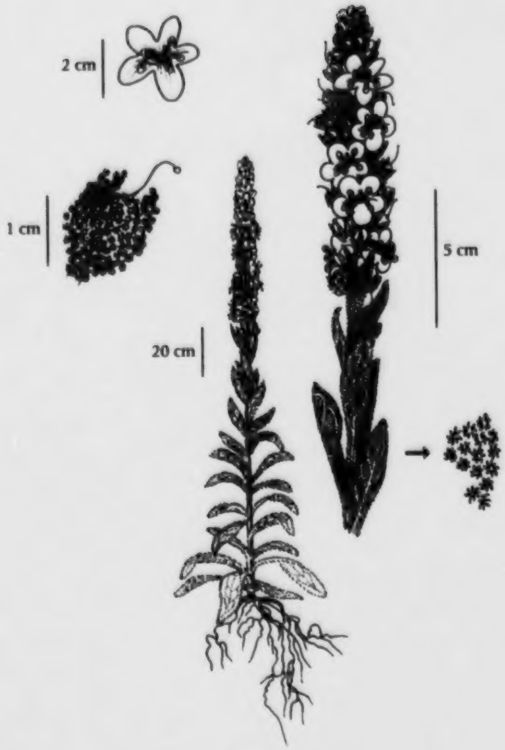
Fruits: Capsules, broadly egg-shaped, 7-10 mm long, woolly; seeds numerous, longitudinally ridged.

VERONICA

1. Main stems terminating in an inflorescence; upper bract-leaves alternate.
    2. Plants rhizomatous perennials.
        3. Styles 5-10 mm long; filaments 4-8 mm long; leaves entire, smooth .... *V. cusickii*
        3. Styles 1-4 mm long; filaments 1-4 mm long; leaves entire or toothed, smooth or hairy.
            4. Capsules longer than wide; stems simple, erect or decumbent at base, long-wavy-hairy; filaments 1-1.5 mm long .... *V. wormskjoldii*
            4. Capsules wider than long; stems tending to creep at base, finely and closely short-hairy; filaments 1-4 mm long .... *V. serpyllifolia*
    2. Plants fibrous-rooted and/or taprooted annuals.
        5. Flower stalks short, 1-2 mm long, shorter than sepals; stems erect.
            6. Leaves, at least middle ones, deeply cleft into linear lobes .... *V. verna*
            6. Leaves entire or toothed to shallowly lobed, but not deeply linear-lobed.
                7. Principal leaves narrowly oblong to oblanceolate, 3-10 times as long as wide; corollas whitish; styles nearly obsolete (less than 0.3 mm long) .... *V. peregrina*



Verbascum phlomoides


2 cm
1 cm
20 cm
5 cm

Verbascum thapsus

7. Principal leaves egg-shaped to broadly elliptic, 1-2 times as long as wide; corollas blue-violet; styles 0.4-1.0 mm long .... *V. arvensis*

5. Flower stalks elongate, mostly 5-35 mm long in fruit, longer than the sepals; stems creeping.

8. Leaves palmately 3- to 5-lobed or coarse-toothed; capsules scarcely or not at all notched .... *V. hederaefolia*

8. Leaves more or less toothed, not palmately lobed; capsules distinctly notched.

9. Leaves kidney-shaped, mostly about 0.5 cm long; flower stalks more than twice as long as leaves .... *V. filiformis*

9. Leaves triangular to broadly elliptic or egg-shaped, more than 1 cm long; flower stalks not more than twice as long as leaves.

10. Leaves broadly egg-shaped or elliptic; flower stalks 15-30 mm long; styles 2-3 mm long .... *V. persica*

10. Leaves lanceolate to egg-shaped; flower stalks 4-8 mm long; styles 0.8-1.4 mm long .... *V. biloba*

1. Main stems never terminating in an inflorescence; all leaves and bracts opposite.

11. Plants hairy; leaf blades egg-shaped, crenate-serrate to dentate; plants of relatively dry sites.

12. Leaf blades coarse-toothed, heart-shaped or squared-off at base; flower stalks greater than 4 mm long; sepals 4-6 mm long, linear-lanceolate, exceeding the capsules .... *V. chamaedrys*

12. Leaf blades toothed, narrowed to base; flower stalks 1-2 mm long; sepals 2-3 mm long, oblong-lanceolate, shorter than the capsules .... *V. officinalis*

11. Plants usually smooth; leaf blades oblong-egg-shaped to linear, finely saw-toothed to entire; plants of aquatic or very wet terrestrial habitats.

13. Leaves all short-stalked .... *V. beccabunga*

13. Leaves, at least the middle and upper ones of the flowering shoots, unstalked and clasping.

14. Capsules not wider than long, slightly or not at all notched at tip; leaves 1.5-5 times as long as wide.

15. Leaves 1.5-3 times as long as wide; fruiting stalks mostly strongly ascending or upcurved; flowers blue or violet .... *V. anagallis-aquatica*

15. Leaves (2.5) 3-5 times as long as wide; fruiting stalks divergently spreading; flowers white to pink or pale blue .... *V. catenata*

14. Capsules much wider than long, notched at tip; leaves (3)4-20 times as long as wide ... *V. scutellata*

Veronica anagallis-aquatica **L.**

blue water speedwell

HABITAT/RANGE:

Wet meadows, ditches, edges of streams and lakes, and shallow water in the lowland and montane zones; rare in S and C BC; introduced from Europe.

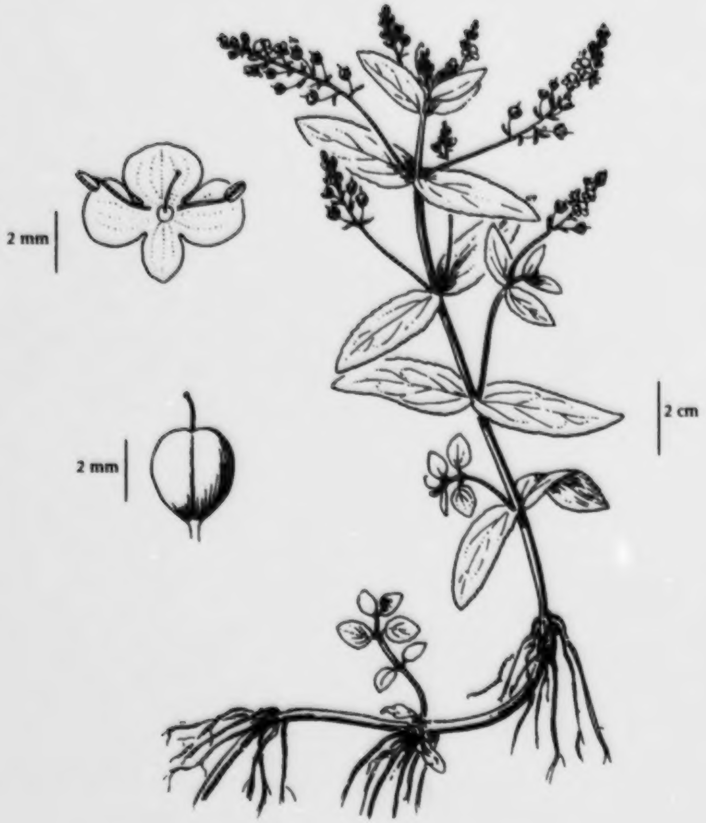
DESCRIPTION:

General: Perennial or sometimes biennial, amphibious herb from a shallow creeping rhizome, smooth throughout or thinly glandular-hairy in the inflorescence; stems decumbent to erect, 10-70 cm long/tall, rooting at the lower nodes, simple to much-branched at the base, somewhat fleshy.

Leaves: Opposite, mostly unstalked, somewhat clasping-based, elliptic to broadly lanceolate, 2-8 (10) cm long, 1.5-3 times as long as wide, usually distinctly but remotely toothed.

Flowers: Inflorescences several long, rather narrow, opposite, stalked racemes arising from the axils of upper leaves, the racemes of to 30 or more stalked flowers, the flower stalks upcurved, 3-8 mm long, as long as or slightly longer than the reduced linear-lanceolate bracts; corollas blue to pale violet with darker lines, saucer-shaped, 5-10 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the lowest lobe narrower than the others; calyces 3-6 mm long, deeply 4-lobed, the lobes unequal, broadly lanceolate; styles 1.5-3 mm long, exserted; stamens 2.

Fruits: Capsules, 2.5-4 mm long, a little longer than wide, plump, somewhat globe-shaped, scarcely notched at the tip; seeds numerous, flattened, 0.3-0.5 mm long.



Veronica anagallis-aquatica

***Veronica arvensis* L.**

wall speedwell

HABITAT/RANGE:

Dry to mesic lawns, fields and waste places in the lowland, steppe and montane zones; frequent in S BC; introduced from Europe.

DESCRIPTION:

General: Annual herb from a taproot; stems erect, 5-30 cm tall/long, often decumbent or creeping at the base, simple to branched at the base, hairy, sometimes also glandular above.

Leaves: Opposite, short-stalked below, unstalked above, egg-shaped to broadly elliptic, 0.5-1.5 cm long, coarse-toothed, hairy.

Flowers: Inflorescence a terminal, bracted, glandular-hairy raceme, at first compact then elongating and lax, of several to many short-stalked flowers, the stalks 0.5-2 mm long, shorter than the bracts, the bracts alternate, the lowermost leaflike, reduced and entire and narrower than the leaves upward; corollas blue to blue-violet, inconspicuous, 2-3 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the upper lobe largest, the lowest lobe narrower than the others; calyces glandular-hairy, 3-5 mm long, deeply 4-lobed, the lobes lanceolate, unequal; styles short, 0.4-1 mm long; stamens 2.

Fruits: Capsules, 2.5-3.5 mm long, flattened, heart-shaped, about as wide as long, distinctly notched at the tip, fringed with hairs or glandular-hairy on the margins; seeds 8 to 12 per chamber, flat, smooth, about 1 mm long.

***Veronica beccabunga* L. ssp. *americana* (Raf.) Sellers** (*V. americana* Schwein. *ex* Benth.)

American speedwell; American brooklime

HABITAT/RANGE:

Wet ditches, swamps, marshes, and shallow water along margins of streams and lakes in the lowland, steppe and montane zones; common in S BC, infrequent northward; N to AK, YT and NT, E to NF and S to NC, NE, TX, NM, AZ, CA, and MX.

DESCRIPTION:

General: Perennial amphibious herb from a shallow creeping rhizome, smooth throughout; stems trailing to ascending, 10-70 cm long/tall, rooting at the lower nodes, simple or branched, somewhat fleshy.

Leaves: Opposite, short-stalked, lanceolate to egg-shaped, 1-5 (8) cm long, usually distinctly toothed.

Flowers: Inflorescences several long, open, opposite, stalked racemes arising from the axils of upper leaves, the racemes of 5 to 25 stalked flowers, the flower stalks much longer than the linear bracts; corollas blue, saucer-shaped, 5-10 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the lowest lobe narrower than the others; calyces 2-5 mm long, deeply 4-lobed, the lobes lanceolate to egg-shaped; styles 2-4 mm long, exserted; stamens 2.

Fruits: Capsules, 3-4 mm long, a little wider than long, plump, somewhat globe-shaped, not or scarcely notched at the tip; seeds numerous, flattened, about 0.5 mm long.

***Veronica biloba* L.**

bilobed speedwell

HABITAT/RANGE:

Mesic to dry roadsides and waste places in the montane zone; rare in SC and SE BC; introduced from W Asia.

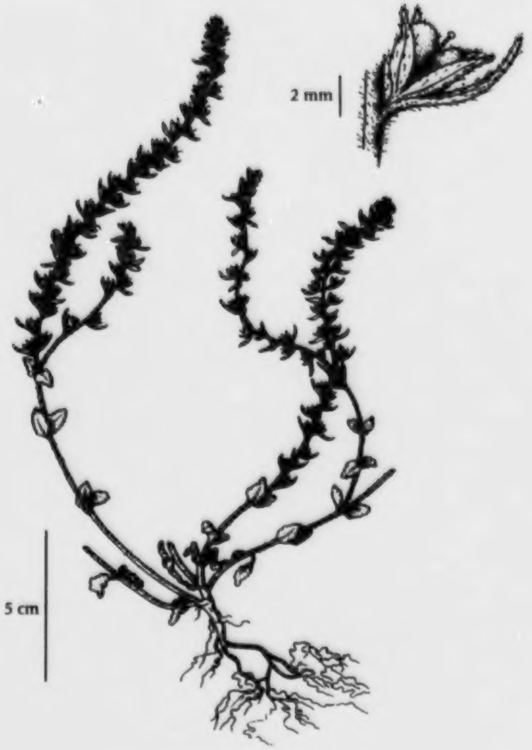
DESCRIPTION:

General: Annual herb from a short taproot; stems erect or ascending, 5-20 cm tall, simple or branched below, long-hairy, also glandular-hairy above.

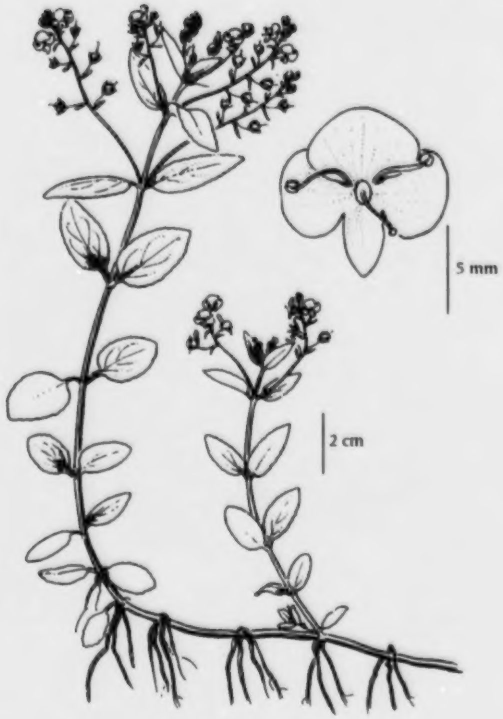
Leaves: Opposite, short-stalked, lanceolate to egg-shaped, 0.5-2.5 cm long, coarse-toothed, hairy.

Flowers: Inflorescence a terminal, glandular-hairy raceme of several to many stalked flowers solitary in the axils of alternate, reduced bracts, the stalks 4-8 mm long, to 15 mm in fruit, longer than the bracts, corollas blue, inconspicuous, 2-4 mm across, irregularly 4-lobed; calyces glandular-hairy, 4-10 mm long, deeply 4-lobed, the lobes broadly lanceolate, often veiny; styles 0.5-1.4 mm long, shorter than the lobes of the capsule; stamens 2.

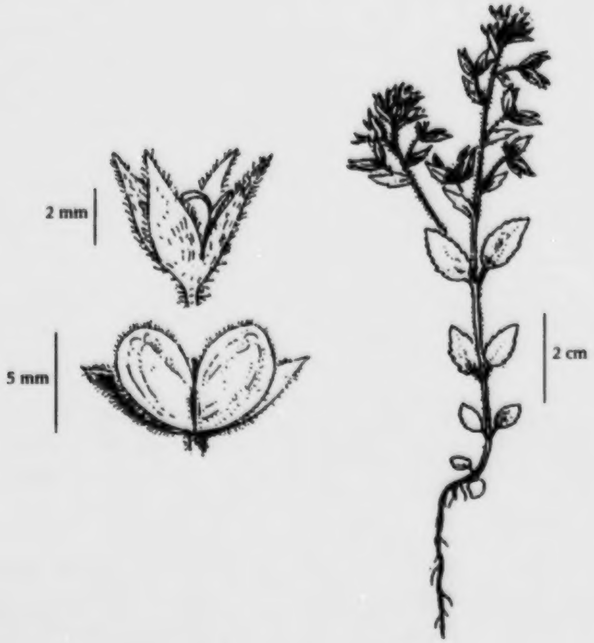
Fruits: Capsules, 3-5 mm long, 4-7 mm wide, flattened, heart-shaped, deeply notched at the tip and lobed to beyond the middle, fringed with long-stalked glandular hairs; seeds 2 to 5 per chamber, cup-shaped, wrinkled, about 2 mm long.



Veronica arvensis



Veronica beccabunga ssp. *americana*



Veronica biloba

***Veronica catenata* Pennell**

pink water speedwell

HABITAT/RANGE:

Wet meadows, ditches, shores, and shallow water along pond edges and slow-moving streams in the lowland and montane zones; rare in S BC; E to PQ and S to PA, OH, MO, OK, NM and CA; Europe.

DESCRIPTION:

General: Perennial or sometimes biennial, amphibious herb from a shallow creeping rhizome, smooth throughout; stems sprawling or decumbent to ascending, 10-60 (100) cm long/tall, rooting at the lower nodes, simple to much-branched at the base, somewhat fleshy, often purple-tinged.

Leaves: Opposite, mostly unstalked, somewhat clasping-based, lanceolate to oblong, 2-6 (9) cm long, 3-5 times as long as wide, entire or obscurely toothed.

Flowers: Inflorescences several long, rather narrow, lax, opposite, stalked racemes arising from the axils of upper leaves, the racemes of 15 to 25 stalked flowers, the flower stalks straight and spreading, 3-7 mm long, slightly shorter than the reduced, broadly lanceolate bracts; corollas white to pink with darker lines or pale blue, saucer-shaped, 4-5 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the lowest lobe narrower than the others; calyces about 3 mm long, deeply 4-lobed, the lobes unequal, broadly lanceolate to egg-shaped; styles 1.3-2 mm long, exserted; stamens 2.

Fruits: Capsules, 2.5-3 mm long, a little wider than long, plump, somewhat globe-shaped, evidently notched at the tip; seeds numerous, flattened, 0.3-0.7 mm long.

***Veronica chamaedrys* L.**

germander speedwell; bird's-eye speedwell

HABITAT/RANGE:

Mesic grassy clearings, lawns, waste places and open forest in the lowland zone; rare in SW and SE BC; introduced from Eurasia.

DESCRIPTION:

General: Perennial herb from a slender rhizome; stems trailing to ascending, 10-40 cm long/tall, rooting at the lower nodes, spreading-hairy in 2 lines.

Leaves: Opposite, unstalked or nearly so, triangular-egg-shaped, 1.5-3 cm long, coarsely blunt-toothed, hairy on the margins and on the veins beneath.

Flowers: Inflorescence of few, loose, opposite (sometimes alternate), stalked racemes arising from the axils of upper leaves, the racemes of several stalked flowers, the flower stalks 5-9 mm long, ascending, somewhat longer than the alternate, lanceolate bracts; corollas blue with a white eye, saucer-shaped, 9-12 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the lowest lobe narrower than the others; calyces hairy, 4-6 mm long, deeply 4-lobed, the lobes lanceolate, more or less equal; styles 3-5 mm long, exserted; stamens 2.

Fruits: Capsules, 3-3.5 mm long, wider than long, flattened, heart-shaped, notched at the tip, hairy and with fringed margins; seeds about 6 per chamber, flattened, about 0.5 mm long.

***Veronica cusickii* A. Gray**

Cusick's speedwell

HABITAT/RANGE:

Moist meadows and rocky slopes in the montane to alpine zones; infrequent in extreme SC BC; S to W MT, ID and CA.

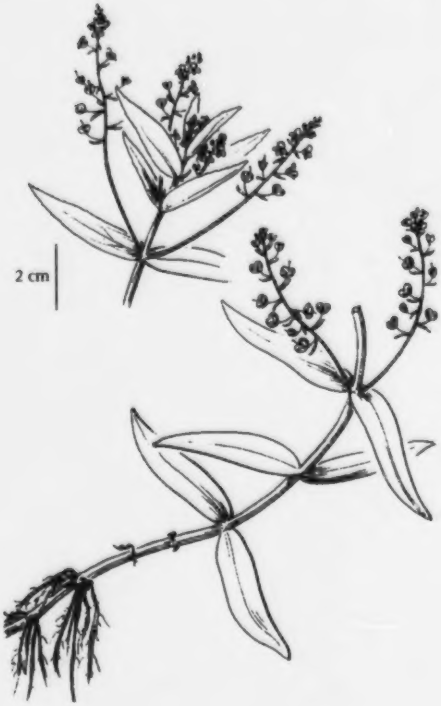
DESCRIPTION:

General: Perennial herb from a shallow rhizome; stems erect or decumbent at the base, 5-20 cm tall, simple, thinly wavy-hairy and often also glandular, glandular-hairy in the inflorescence.

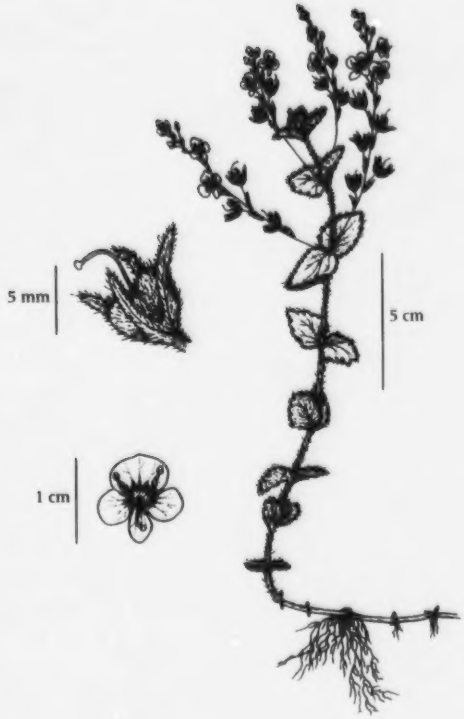
Leaves: Opposite, unstalked, elliptic to egg-shaped, 1-2.5 cm long, entire, smooth.

Flowers: Inflorescence a compact, terminal, bracted raceme of several stalked flowers; corollas deep blue-violet, saucer-shaped, 8-13 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the upper lobe largest, the lowest lobe narrower than the others; calyces glandular-hairy, deeply 4-lobed, the lobes narrowly egg-shaped, unequal; styles 5-10 mm long, conspicuously exserted; stamens 2, exserted, the filaments 4-8 mm long.

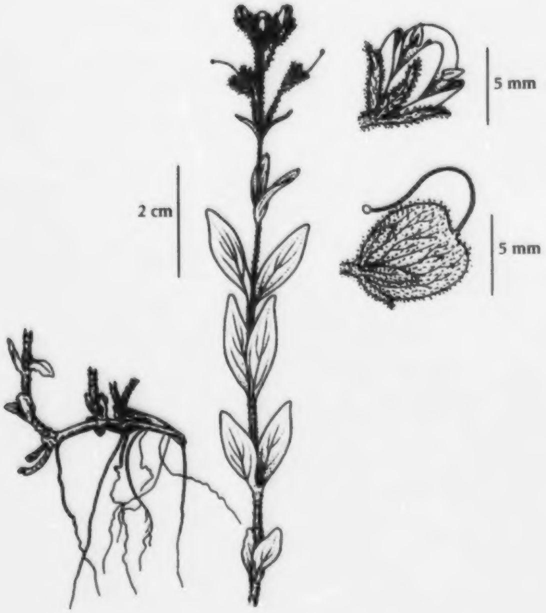
Fruits: Capsules, 4-6 mm long, a little longer than wide, flattened, heart-shaped, distinctly to scarcely notched at the tip, glandular-hairy; seeds numerous, flat, about 1 mm long.



Veronica catenata



Veronica chamaedrys



Veronica cusickii

Veronica filiformis **Sm.**

slender speedwell

HABITAT/RANGE:

Moist grassy clearings and lawns in the lowland zone; rare in SW and SC BC; introduced from Asia.

DESCRIPTION:

General: Perennial herb from a slender rhizome; stems numerous, slender, creeping, 10-40 cm long, mat-forming, rooting at the nodes, hairy.

Leaves: Opposite, short-stalked, kidney-shaped in outline, about 0.5 cm long, slightly wider than long, blunt-toothed, squared-off at the base, hairy.

Flowers: Inflorescence a terminal, open raceme of several to many stalked flowers solitary in the axils of alternate, nearly full-size leaves, the thread-like stalks 1-3 cm long, several times as long as the subtending leaves, downcurved in fruit; corollas pale lavender-blue, saucer-shaped, 10-15 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the upper lobe largest, the lowest lobe narrower than the others; calyces 3-5 mm long, deeply 4-lobed, the lobes oblong; styles about 3 mm long; stamens 2.

Fruits: Capsules, 3-4 mm long, plump, nearly globe-shaped, wider than long, notched at the tip, fringed with long hairs; seeds cup-shaped, about 1.5 mm long.

Veronica hederaefolia **L.**

ivy-leaved speedwell

HABITAT/RANGE:

Moist fields, lawns and waste places in the lowland and montane zones; rare in SW BC; introduced from Europe.

DESCRIPTION:

General: Annual herb from a taproot; stems weak, prostrate to ascending, 5-40 cm long, branched at the base, spreading-hairy.

Leaves: Opposite, stalked, kidney-shaped in outline, 0.5-2 cm wide, wider than long, palmately veined and 3- to 5-lobed or coarse-toothed, squared-off at the base, sparsely spreading-hairy and the margins fringed with long hairs, the stalks up to as long as the blades.

Flowers: Inflorescence a terminal, elongate, smooth raceme, of several to many stalked flowers solitary in the axils of alternate, full-size leaves, the stalks 5-15 mm long; corollas pale blue, saucer-shaped, 3-6 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the upper lobe largest, the lowest lobe narrower than the others; calyces glandular-hairy, 3-7 mm long, deeply 4-lobed, the lobes broadly triangular, the margins conspicuously fringed with long hairs; styles short, 0.6-1 mm long; stamens 2.

Fruits: Capsules, 2.5-4 mm long, plump, nearly globe-shaped, wider than long, scarcely notched at the tip, smooth; seeds 1 or 2 per chamber, cup-shaped, cross-wrinkled, 2-3 mm long.

Veronica officinalis **L.**

common speedwell

HABITAT/RANGE:

Mesic to dry fields, roadsides and open forests in the lowland, steppe and montane zones; infrequent in S BC, rare northward; introduced from Eurasia.

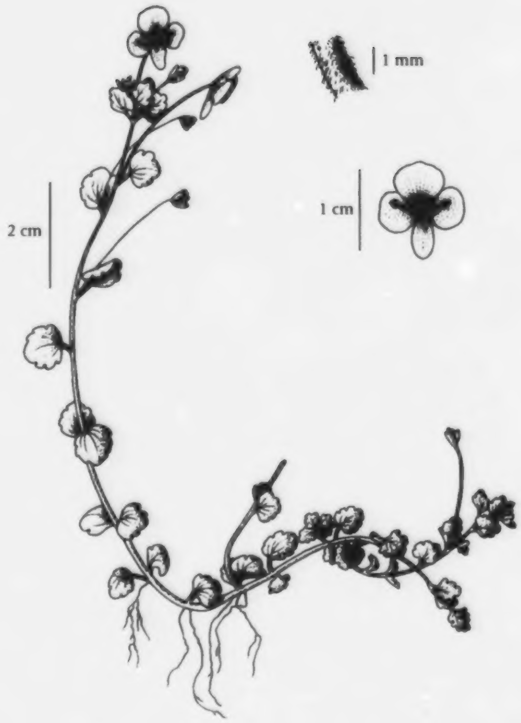
DESCRIPTION:

General: Perennial herb from fibrous roots; stems creeping to 40 cm long, rooting at the nodes, often mat-forming, then ascending 5-25 cm tall, spreading-hairy.

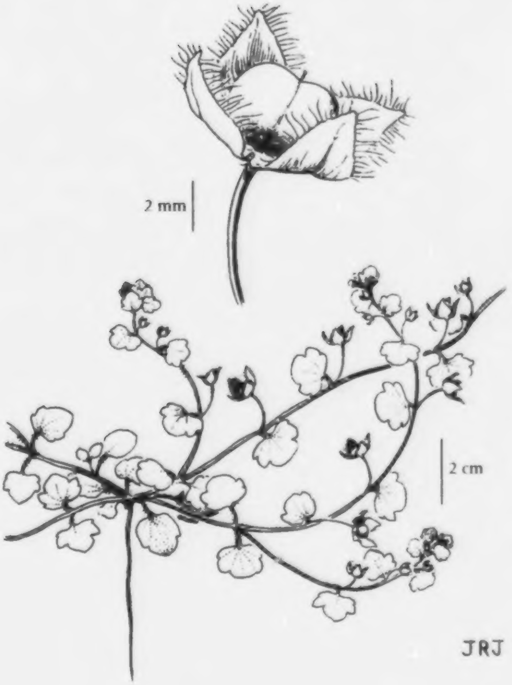
Leaves: Opposite, short-stalked, elliptic, 1.5-5 cm long, toothed, hairy on both surfaces.

Flowers: Inflorescence of 1 to few, opposite, stalked, spike-like racemes arising from the axils of upper leaves, the racemes of several stalked flowers, the flower stalks 1-2 mm long, somewhat shorter than the alternate, narrowly lanceolate bracts; corollas light blue or lilac, saucer-shaped, 4-8 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the lowest lobe narrower than the others; calyces hairy, 4-6 mm long, deeply 4-lobed, the lobes lanceolate, more or less equal; styles 3-4 mm long, exserted; stamens 2.

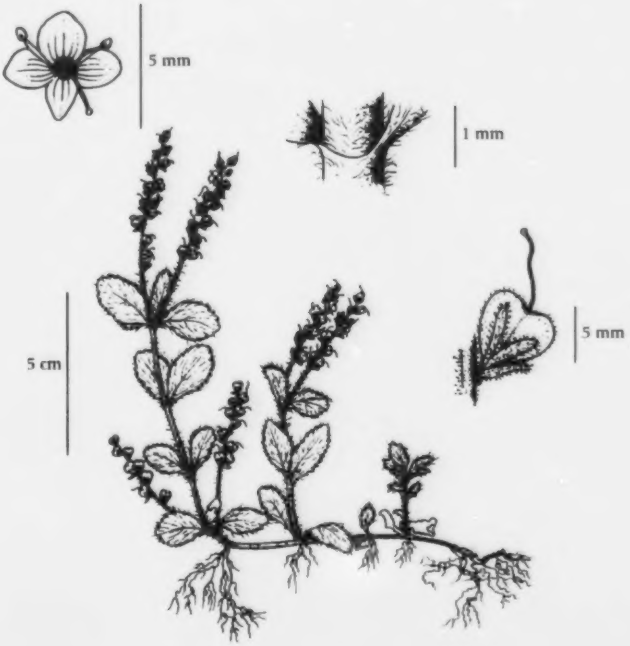
Fruits: Capsules, 4 mm long, about as wide as long, flattened, broadly triangular or heart-shaped, scarcely to shallowly notched at the tip, hairy; seeds 6 to 12 per chamber, about 1 mm long.



Veronica filiformis



Veronica hederaefolia


5 mm
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Veronica officinalis

***Veronica peregrina* L.**

purslane speedwell

HABITAT/RANGE:

Moist to wet roadsides, ditches, streambanks, vernal pools, meadows and clearings; frequent throughout S BC, rare northward (var. *xalapensis*), and rare (var. *peregrina*) on Vancouver Island and the lower Fraser Valley, where probably introduced from eastern N America; var. *xalapensis* – E to PQ and NS and S to NH, PA, FL, AL, AR, TX , NM, AZ, CA and MX.

DESCRIPTION:

General: Annual herb from a short taproot and fibrous roots; stems erect or ascending, 5-30 cm tall, simple or branched at the base, glandular-hairy or smooth.

Leaves: Opposite, unstalked or the lowermost tapering to a stalk-like base, narrowly oblong to lanceolate, 0.5-3 cm long, irregularly toothed or entire, usually smooth.

Flowers: Inflorescence a terminal, bracted, elongate, lax raceme of several to many, very short-stalked (0.5-1.5 mm) flowers, the bracts alternate, gradually reduced upward; corollas whitish, inconspicuous, 2-3 mm across, irregularly 4-lobed; calyces short glandular-hairy or smooth, 3-6 mm long, deeply 4-lobed, the lobes lanceolate, unequal; styles very short, 0.1-0.4 mm long; stamens 2.

Fruits: Capsules, 3-4 mm long, flattened, heart-shaped, about as wide as long, broadly notched at the tip, glandular-hairy or smooth; seeds numerous, 0.4-1 mm long.

Notes: Two varieties occur in BC:

1. Plants smooth; rare on Vancouver Island and the lower Fraser Valley .... var. *peregrina*

1. Plants short stalked-glandular in the inflorescences and on the capsules; the frequent variety .... var. *xalapensis* (H.B.K.) St. John & Warren

***Veronica persica* Poir.**

bird's-eye speedwell

HABITAT/RANGE:

Moist to dry, grassy roadsides, lawns, fields and waste places in the lowland and steppe zones; infrequent in S BC; introduced from Eurasia.

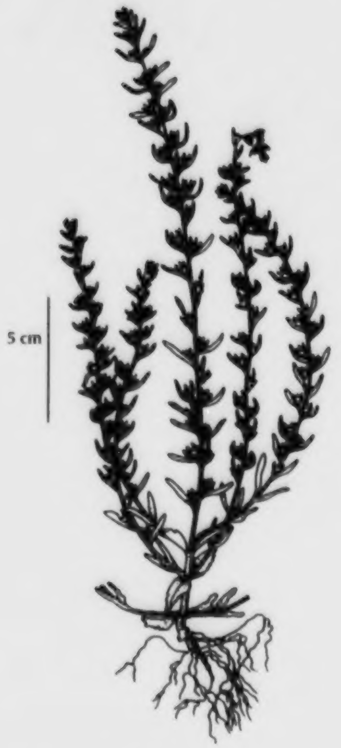
DESCRIPTION:

General: Annual herb from a short taproot; stems prostrate to loosely ascending, often decumbent at the base and sometimes rooting at the lower nodes, 10-40 cm long/tall, simple or branched at the base, soft-hairy.

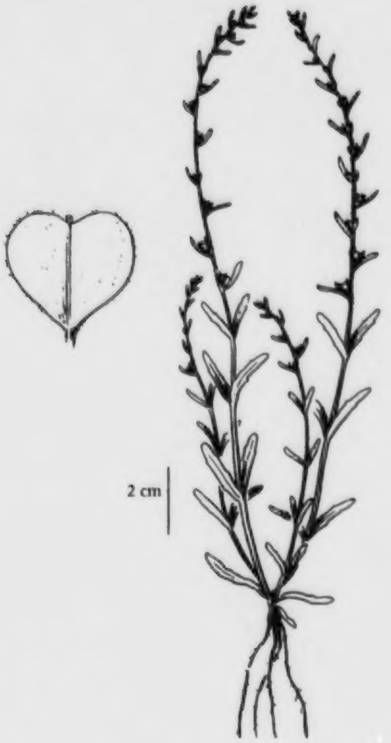
Leaves: Opposite, short-stalked, broadly egg-shaped to elliptic, 1-2.5 cm long, coarsely blunt-toothed, hairy.

Flowers: Inflorescence an open, terminal, bracted, lax raceme of several to many stalked flowers, the bracts alternate, leaflike at the lower nodes, gradually reduced upward, the stalks 15-30 mm long, recurved in fruit, longer than the bracts; corollas blue, saucer-shaped, (5) 8-12 mm across, irregularly 4-lobed, the lower lobe often paler or white, narrower than the others; calyces 4-8 mm long, deeply 4-lobed, the lobes broadly lanceolate, veiny, fringed with long hairs; styles 1.5-3 mm long, longer than the lobes of the capsule; stamens 2.

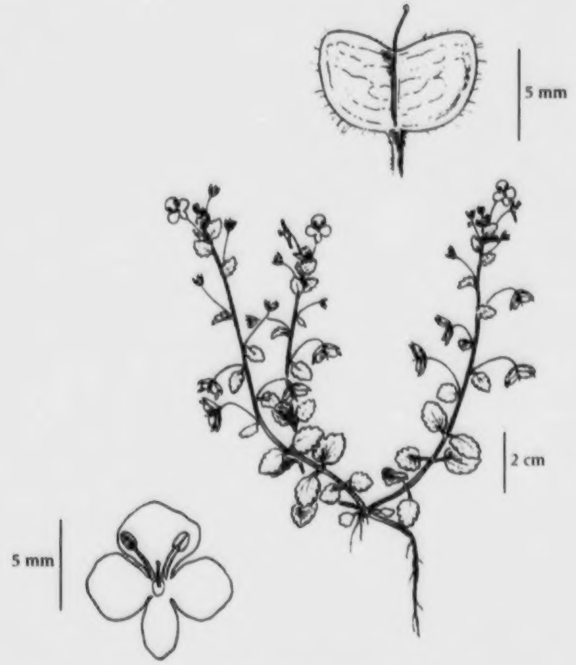
Fruits: Capsules, 3-5 mm long, 5-8 mm wide, flattened, broadly notched at the tip and lobed to not beyond the middle, the lobes divergent and sharply keeled, fringed with long hairs; seeds 5 to 11 per chamber, cup-shaped, cross-wrinkled, 1-2 mm long.



Veronica peregrina var. *peregrina*



Veronica peregrina var. *xalapensis*



Veronica persica

Veronica scutellata **L.**

marsh speedwell

HABITAT/RANGE:

Swamps, fens, marshes, wet meadows and edges of streams and lakes in the lowland, steppe and montane zones; infrequent throughout BC; N to AK, YT and NT, E to NF and S to NH, PA, NC, TN, LA, CO, ID, NV and CA; Eurasia.

DESCRIPTION:

General: Perennial amphibious herb from a shallow creeping rhizome, smooth throughout or sometimes fine-hairy; stems decumbent to ascending, 10-40 cm long/tall, rooting at the lower nodes, simple to much-branched at the base, somewhat fleshy, often purple-tinged.

Leaves: Opposite, unstalked, linear to narrowly lanceolate, 2-4 (8) cm long, 4-20 times as long as wide, entire or remotely few-toothed, often purple-tinged.

Flowers: Inflorescences several long, open, lax, stalked racemes arising from the axils of upper leaves, the racemes of 5 to 20 stalked flowers, the thread-like flower stalks spreading at maturity, 6-17 mm long, much longer than the reduced, linear bracts; corollas blue or white with purple lines, saucer-shaped, 6-10 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the lowest lobe narrower than the others; calyces about 3 mm long, deeply 4-lobed, the lobes more or less equal, egg-shaped; styles 2-4 mm long, exserted; stamens 2.

Fruits: Capsules, 2.5-4 mm long, distinctly wider than long, flattened, broadly notched at the tip; seeds 5 to 9 per chamber, 1.2-1.8 mm long.

Veronica serpyllifolia **L.**

thyme-leaved speedwell

HABITAT/RANGE:

Mesic to wet meadows, fields, streambanks, thickets, open forests and waste places in the lowland, steppe, montane and lower subalpine zones; frequent throughout BC, especially southward; var. *humifusa* – circumpolar, N to AK, E to NF and S to NH, NY, MI, WI, MN, NM, AZ, CA and MX; Eurasia, var. *serpyllifolia* – introduced from Europe.

DESCRIPTION:

General: Perennial herb from a creeping rhizome; stems ascending, 10-30 cm tall/long, often decumbent or creeping at the base and producing prostrate, nodally rooting branches, otherwise simple, finely and closely short-hairy, or smooth.

Leaves: Opposite, often short-stalked below, unstalked above, elliptic to broadly egg-shaped, 1-2.5 cm long, obscurely blunt-toothed to entire, smooth or nearly so.

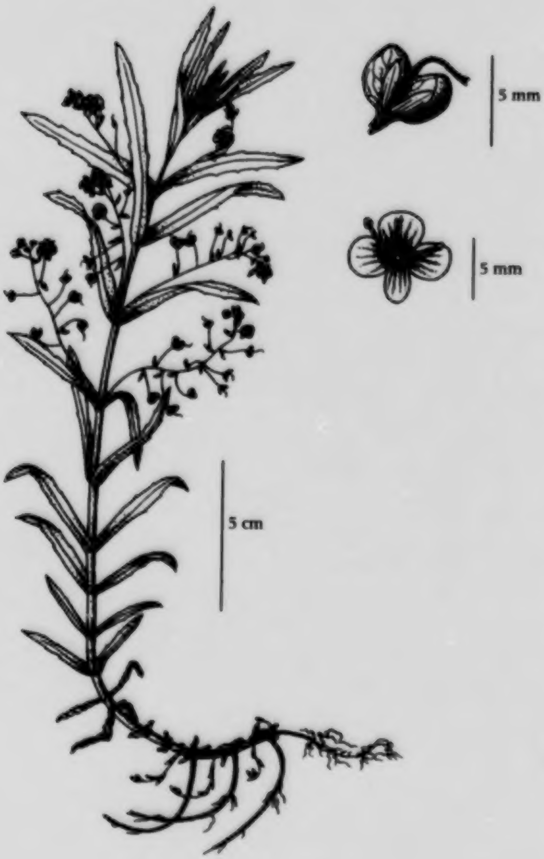
Flowers: Inflorescence a terminal bracted raceme, at first compact then elongating and lax, of several to many (to 30) stalked flowers, the stalks finely short-hairy and often also glandular, shorter than the bracts, at least the upper bracts alternate, the lower gradually passing into leaves; corollas bright blue or pale blue to white with darker blue lines, saucer-shaped, 4-8 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the upper lobe largest, the lowest lobe narrower than the others; calyces short-hairy or glandular-hairy, deeply 4-lobed, the lobes oblong to egg-shaped, 2-4 mm long, slightly unequal; styles short, 2-3.5 mm long; stamens 2, exserted, the filaments 1-4 mm long.

Fruits: Capsules, 3-4 mm long, flattened, heart-shaped, wider than long, distinctly notched at the tip, thinly glandular-hairy; seeds numerous, about 0.7 mm long.

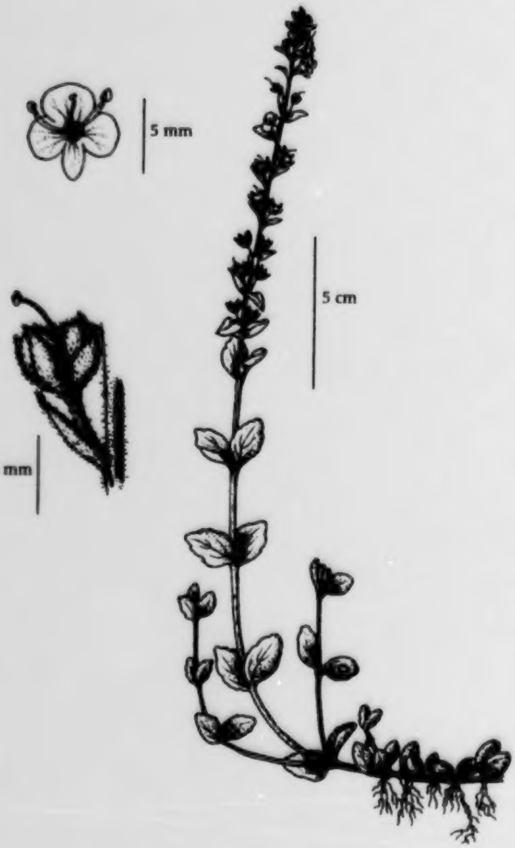
Notes: Two varieties occur in BC:

1. Axis of inflorescence and flower stalks minutely incurved-hairy, non-glandular; corollas to 5 mm wide; introduced in SW and E BC .... var. *serpyllifolia*

1. Axis of inflorescence and flower stalks finely minute-hairy but also with spreading glandular hairs; corollas to 8 mm wide; native throughout BC .... var. *humifusa* (Dickson) Vahl



Veronica scutellata



Veronica serpyllifolia var. *humifusa*

Veronica verna **L.**

spring speedwell

HABITAT/RANGE:

Dry meadows, grasslands and waste places in the steppe zone; frequent in SC and SE BC; introduced from Eurasia.

DESCRIPTION:

General: Annual herb from a taproot; stems erect, 3-15 cm tall, simple to branched at the base, hairy, also glandular above especially in the inflorescence.

Leaves: Opposite, short-stalked below, unstalked above, egg-shaped to broadly elliptic, about 1 cm long, some pinnately 3- to 7-lobed, hairy.

Flowers: Inflorescence a terminal, bracted, glandular-hairy, relatively dense raceme of several to many short-stalked flowers, the bracts alternate, the lowermost leaflike, reduced and entire and narrower than the leaves upward; corollas blue to blue-violet, inconspicuous, 2-3 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the upper lobe largest, the lowest lobe narrower than the others; calyces glandular-hairy, 3-5 mm long, deeply 4-lobed, the lobes lanceolate, unequal; styles short, 0.5-0.6 mm long; stamens 2.

Fruits: Capsules, about 3 mm long, flattened, heart-shaped, slightly wider than long, distinctly notched at the tip, glandular-hairy; seeds 8 to 12 per chamber, flat, smooth, about 1 mm long.

Veronica wormskjoldii **Roemer & Schultes var. *wormskjoldii*** (*V. alpina* L. var. *wormskjoldii* Hook.)

alpine speedwell

HABITAT/RANGE:

Moist meadows, streambanks and heathlands in the montane to alpine zones; common throughout BC; N to AK, YT and NT, E to AB, disjunct to ON, PQ and NF and S to ME, NH, NM AZ and CA.

DESCRIPTION:

General: Perennial herb from a shallow rhizome; stems erect or decumbent at the base, 10-30 cm tall, simple, long wavy-hairy, also glandular in the inflorescence.

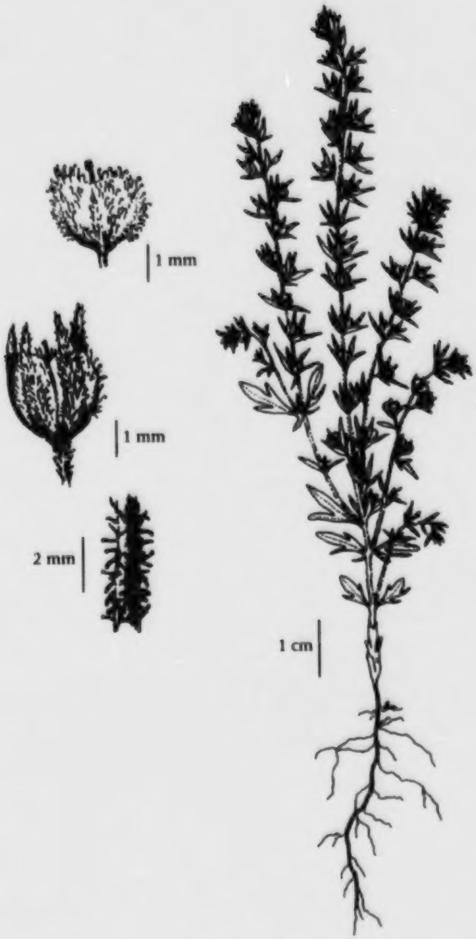
Leaves: Opposite, unstalked, elliptic to lanceolate, 1-4 cm long, entire to blunt-toothed, smooth to long-wavy-hairy.

Flowers: Inflorescence a terminal bracted raceme, at first compact then elongating, of several stalked flowers; corollas violet-purple to light blue, saucer-shaped, 6-10 mm across, irregularly 4-lobed, the lobes much longer than the short tube, the upper lobe largest, the lowest lobe narrower than the others; calyces glandular-hairy, deeply 4-lobed, the lobes lanceolate, 3-6 mm long; styles short, 1-3 mm long; stamens 2, exserted, the filaments 1-1.5 mm long.

Fruits: Capsules, 4-7 mm long, flattened, heart-shaped, longer than wide, notched at the tip, glandular-hairy; seeds numerous, flat, about 1 mm long.

SOLANACEAE

1. Fruits dry, dehiscent capsules; corollas 2-10 cm long.
    2. Leaves irregularly toothed or angled and shallowly lobed; fruits densely prickly .... *Datura*
    2. Leaves simple, entire; fruits not prickly .... *Nicotiana*
1. Fruits fleshy berries; corollas less than 2 cm long.
    2. Corolla lobes much longer than the short tube, saucer- or wheel-shaped; anthers longer than filaments, convergent .... *Solanum*
    2. Corolla lobes shorter than or about equal to tube, funnel-shaped; anthers about equal to or shorter than filaments, free .... *Lycium*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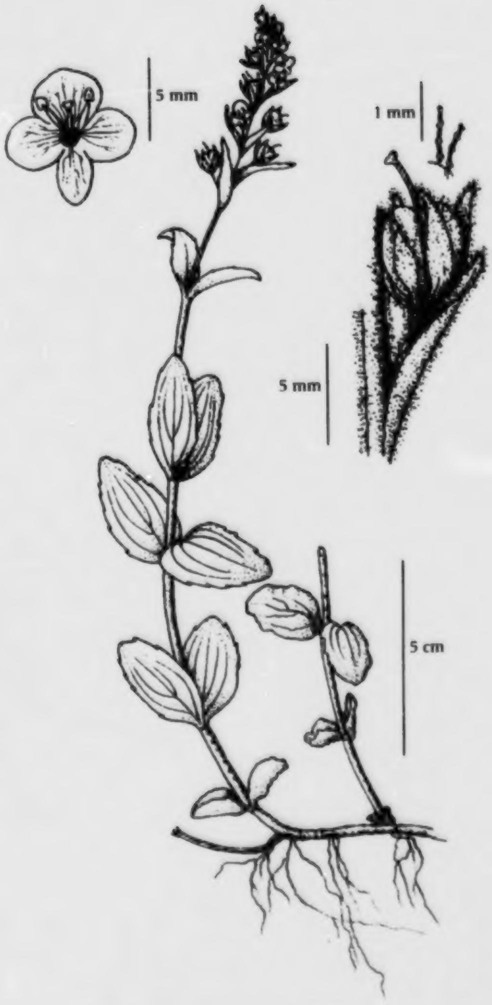
2 mm
1 cm

Veronica verna


5 mm
1 mm
5 mm
5 cm

Veronica wormskjoldii var. *wormskjoldii*

DATURA

Datura stramonium **L.**

jimsonweed

HABITAT/RANGE:

Mesic to dry waste places in the lowland and steppe zones; rare in S BC; introduced from Mexico.

DESCRIPTION:

General: Annual herb from a fibrous root; stems erect, solitary, branched, smooth, 50-150 cm tall.

Leaves: Basal leaves lacking; stem leaves egg-shaped, irregularly toothed or angled, shallowly lobed, 5-20 cm long, 4-15 cm wide.

Flowers: Inflorescence of terminal, single flowers; corollas white, tubular, the tubes 6-10 cm long, the limbs 3-5 cm tall, shallowly lobed with projecting teeth up to 1 cm long; calyces 3.5-5 cm long, shortly 5-lobed.

Fruits: Capsules, dry, dehiscent egg-shaped, 3-5 cm long, densely prickly; seeds poisonous.

LYCIUM

Lycium barbarum **L.** (*L. halimifolium* P. Mill.)

matrimony vine

HABITAT/RANGE:

Dry waste places, rocky slopes and roadsides in the steppe zone; rare in SC BC; introduced from Europe.

DESCRIPTION:

General: Deciduous shrub with long, weak, sparsely thorny, smooth, climbing branches, 1-6 m tall.

Leaves: Alternate, elliptic to lanceolate or oblanceolate, 3-7 cm long and 1.5-3.5 cm wide on new shoots, 1-1.5 cm long and 2-3 mm wide on old stems, short-stalked, entire.

Flowers: Inflorescence of 1-4 axillary flowers on stalks 0.7-2 cm long; corollas lavender or purple, funnel-shaped, 9-14 mm long, with 4-7 spreading lobes, the lobes shorter than the tube; calyces tubular, 3-5 mm long, 3- to 6-lobed.

Fruits: Berries, egg-shaped, red, 1-2 cm long; seeds 10-20.

NICOTIANA

Nicotiana attenuata **Torr. *ex* Wats.**

wild tobacco; coyote tobacco

HABITAT/RANGE:

Dry cliff bases and sandy slopes in the steppe zone; rare in SC BC, known recently only from Osoyoos; disjunct E to ON and PQ and S to NH, NY, PA, SC, FL, LA, TX, NM, AZ, CA and MX.

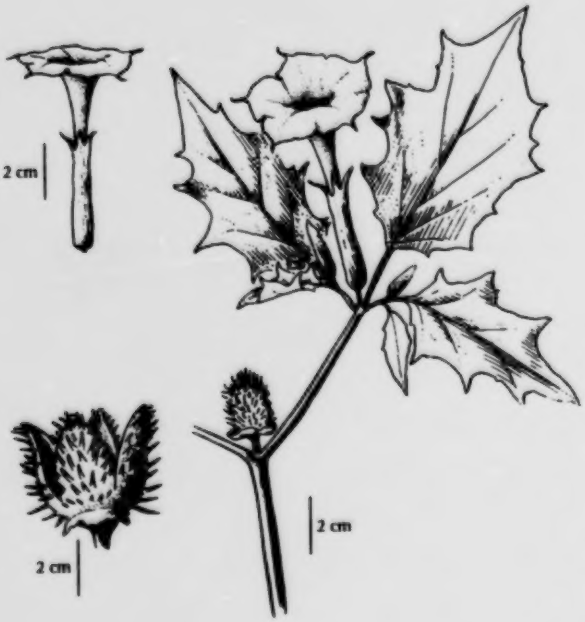
DESCRIPTION:

General: Annual herb from a taproot; stems erect, solitary, simple, glandular-hairy, 30-150 cm tall.

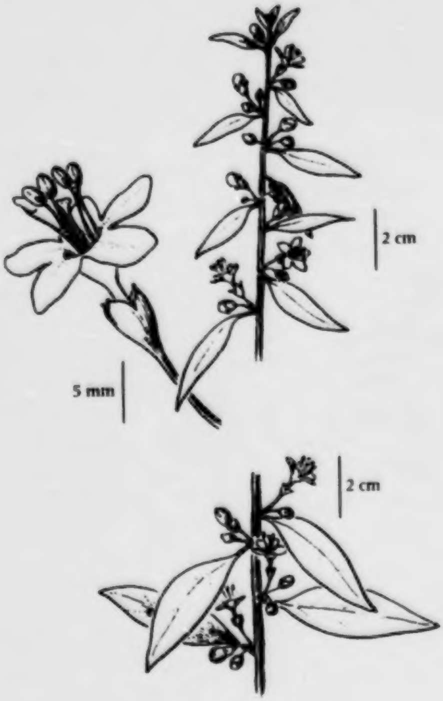
Leaves: Basal leaves elliptic to egg-shaped, 2.5-12 cm long, 1-5 cm wide, glandular-hairy, stalked; stem leaves similar, reduced and narrower upwards.

Flowers: Inflorescence of numerous flowers in an elongate panicle; corollas dirty white or yellowish, tubular, the tubes 2-2.7 cm long, the limbs 4-8 mm tall, shallowly lobed; calyces 6-10 mm long, shortly 5-lobed.

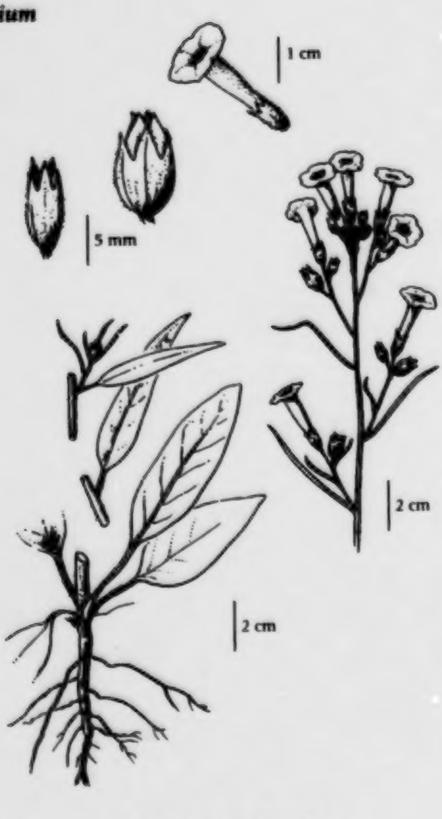
Fruits: Capsules, dry, dehiscent, egg-shaped, 8-12 mm long; seeds numerous, brown.



Datura stramonium



Lycium barbarum


1 cm
5 mm
2 cm
2 cm

Nicotiana attenuata

SOLANUM

1. Plants climbing or scrambling perennial vines; flowers purple; fruits red .... *S. dulcamara*

1. Plants annual herbs, not climbing; flowers white or yellow; fruits green or black.

  2. Plants spiny; flowers yellow, 2-3 cm wide .... *S. rostratum*

  2. Plants not spiny; flowers white or creamy, less than 1 cm wide.

    3. Leaves deeply lobed .... *S. triflorum*

    3. Leaves entire, toothed or wavy-margined.

      4. Calyces 4-6 mm long at maturity, cupping the fruit; stems with spreading hairs .... *S. physalifolium*

      4. Calyces 2-3 mm long at maturity, not cupping the fruit; stems smooth or appressed-hairy .... *S. americanum*

Solanum americanum **P. Mill. var. *nodiflorum* (N. J. Jacq.) Edmonds** (*S. nodiflorum* N.J. Jacq.; *S. nigrum auct non* L.)

black nightshade

HABITAT/RANGE:

Mesic to dry waste places in the lowland and steppe zones; infrequent in S BC; probably introduced from E or S US.

DESCRIPTION:

General: Annual herb from a taproot; stems erect, single, branched, smooth or more or less appressed short-hairy above, 15-60 cm tall.

Leaves: Basal leaves lacking; stem leaves egg-shaped to deltoid, irregularly toothed to nearly entire, 2-8 cm long, 1-5.5 cm wide, stalked.

Flowers: Inflorescence a few-flowered axillary cluster on an ascending stalk; corollas white to faintly bluish, 5-10 mm wide, lobed, the lobes bent back; calyces 2-3 mm long at maturity, not cupping the fruit, lobed, the lobes unequal.

Fruits: Berries, globe-shaped, black, 8 mm wide, shiny; seeds 1-1.5 mm long.

Solanum dulcamara **L. var. *dulcamara***

European bittersweet

HABITAT/RANGE:

Moist to mesic waste places in the lowland and steppe zones; common in SW BC (lower Fraser Valley) infrequent in SC and SE BC; introduced from Eurasia.

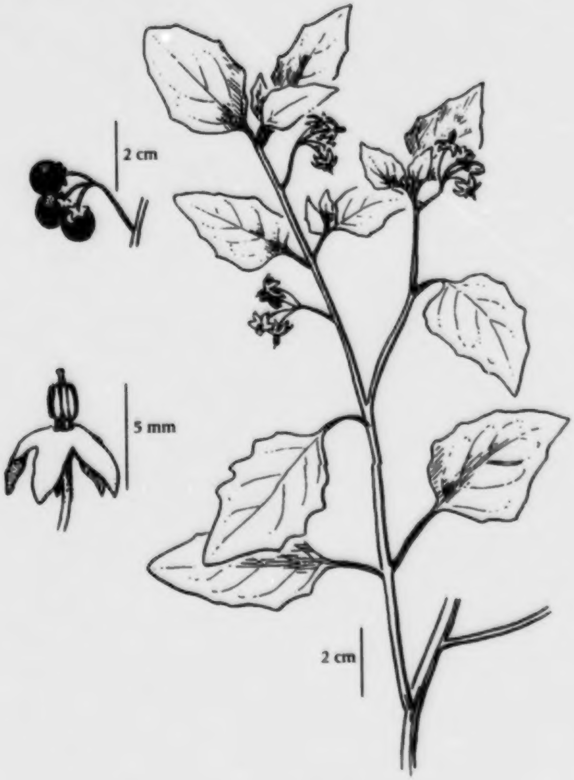
DESCRIPTION:

General: Perennial vine from a rhizome; stems shrubby below, 0.1-3 m long.

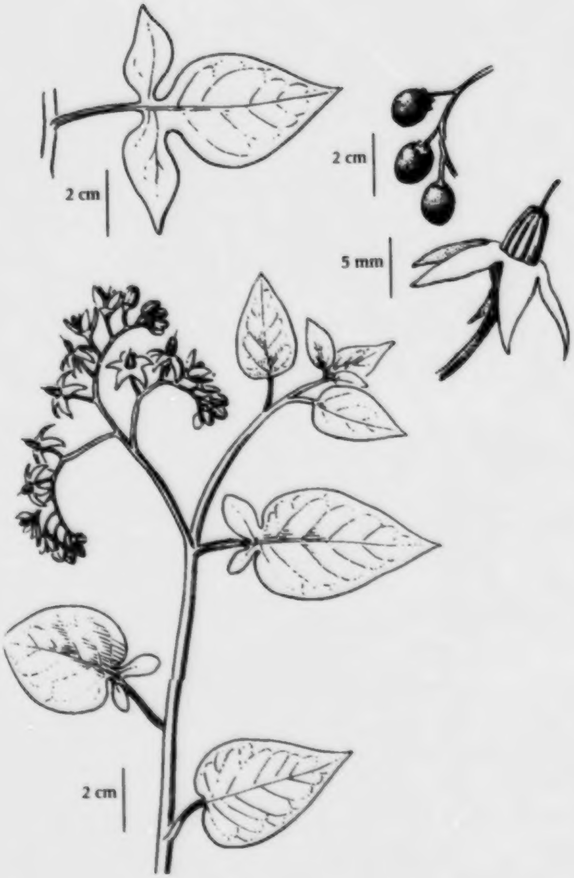
Leaves: Basal leaves lacking; stem leaves widely egg-shaped, sometimes with basal lobes, heart-shaped at the base, 2.5-8 cm long, 1.5-5 cm wide.

Flowers: Inflorescence of terminal, umbrella-shaped clusters of flowers on stalks 1.5-4 cm long; corollas blue or violet, lobed, the lobes 5-9 mm long but soon bent back; calyces 3-4 mm long; anthers yellow.

Fruits: Berries, globe- to egg-shaped, bright red, 8-11 mm wide; seeds 2-3 mm long.



Solanum americanum* var. *nodiflorum


2 cm
2 cm
5 mm
2 cm

Solanum dulcamara* var. *dulcamara

***Solanum physalifolium* Rusby** (*S. sarrachoides auct. non* Sendtner)

hairy nightshade

HABITAT/RANGE:

Mesic to dry waste places, roadsides and fields in the lowland and steppe zones; infrequent in SW and SC BC; introduced from S America.

DESCRIPTION:

General: Annual herb from a taproot; stems softly spreading-hairy with flattened often sticky gland-tipped hairs, hairy on veins beneath, 10-90 cm tall.

Leaves: Basal leaves lacking; stem leaves egg-shaped to deltoid, entire or toothed or wavy margined, stalked, 2-8 cm long, 1.5-5 cm wide.

Flowers: Inflorescence of axillary, few-flowered clusters, the flowers on ascending stalks; corollas white to pale blue, 5-10 mm wide, lobed, the lobes spreading to bent back; calyces 4-9 mm long at maturity, cupping the fruit, sticky-hairy, lobes unequal.

Fruits: Berries, globe-shaped, yellowish, 6-7 mm wide; seeds about 2 mm long.

***Solanum rostratum* Dunal** (*Androcera rostrata* [Dunal] Rydb., *Solanum cornutum* Lam.)

buffalo-bur

HABITAT/RANGE:

Mesic to dry waste places and roadsides in the lowland and steppe zones; rare in S BC; introduced from central US.

DESCRIPTION:

General: Annual herb from a taproot; stems erect, 10-70 cm tall, solitary, branched, hairy, the hairs star-shaped, also with yellow spines 3-12 mm long.

Leaves: Basal leaves lacking; stem leaves 6-20 cm long, 2-7 cm wide, lobed, the lobes mostly rounded, hairy, the hairs star-shaped, also spiny on the midveins.

Flowers: Inflorescence of terminal racemes on short stalks with 3-15 flowers; corollas light yellow, 2-3 cm wide when expanded; calyces enclosing the fruit, prickly; anthers unequal, 1 anther curved and about 4 mm longer than the others.

Fruits: Berries, globe-shaped, 9-12 mm; seeds 2-2.5 mm wide.

***Solanum triflorum* Nutt.**

cut-leaved nightshade

HABITAT/RANGE:

Mesic to dry waste places, roadsides and fields in the lowland and steppe zones; infrequent in S BC; introduced from S America.

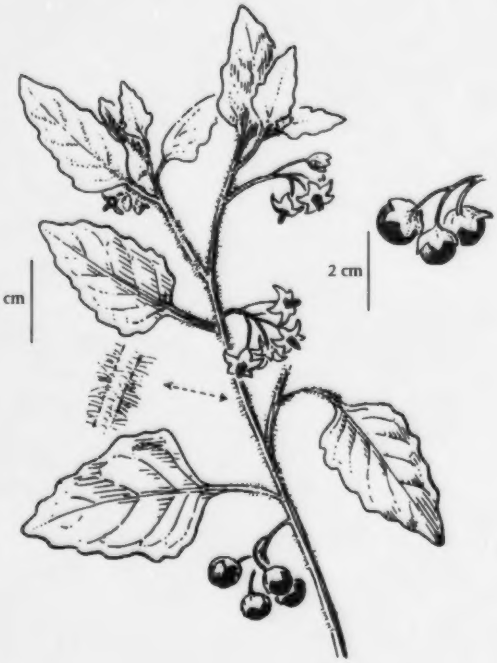
DESCRIPTION:

General: Annual herb from a taproot; stems branched from the base, decumbent below, short-hairy to nearly smooth, 10-60 cm long.

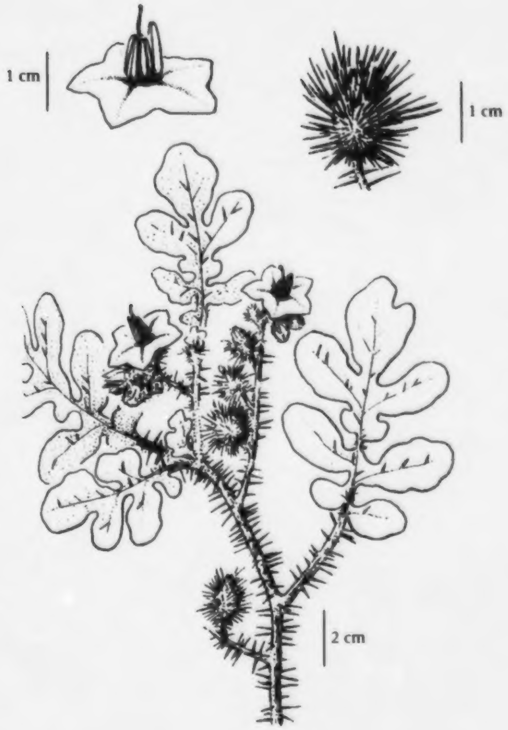
Leaves: Basal leaves spoon-shaped, lobed, short-hairy, 2-5 cm long; stem leaves oblong to egg-shaped, deeply lobed, short-stalked, short-hairy, lobed, the lobes spreading to bent back, 2-5 cm long, 1-3 cm wide.

Flowers: Inflorescence of axillary, few-flowered clusters, the flowers on drooping stalks; corolla white, tubular, 5-9 mm wide when expanded, lobed, the lobes spreading to bent back, calyces becoming larger with age, lobed, the lobes unequal and up to 6 mm long at maturity.

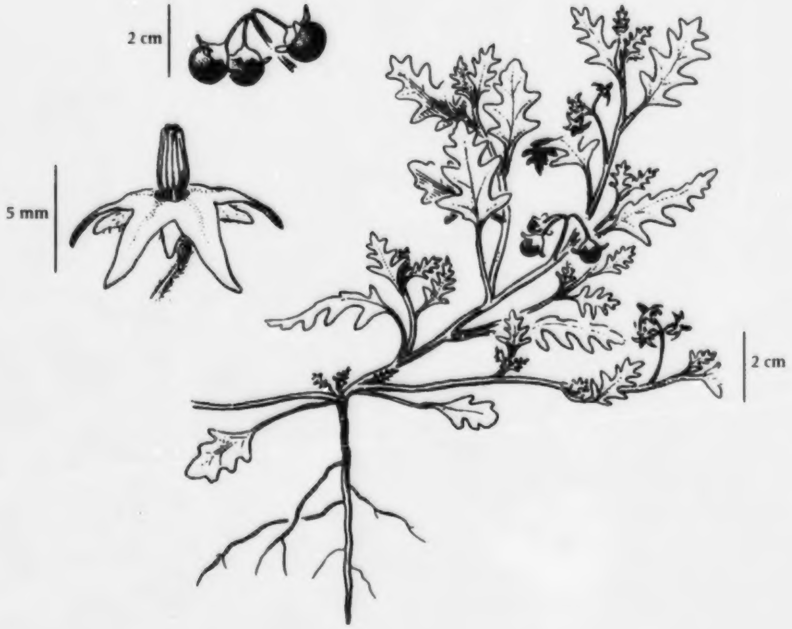
Fruits: Berries, globe-shaped, greenish, 9-14 mm wide; seeds 2.5-3 mm long.



Solanum physalifolium



Solanum rostratum



Solanum triflorum

THYMELAEACEAE

DAPHNE

***Daphne laureola* L.**

spurge-laurel

HABITAT/RANGE:

Mesic forests and waste areas in the lowland zone; infrequent on S Vancouver Island, the Gulf Islands and adjacent mainland; introduced from Eurasia.

DESCRIPTION:

General: Evergreen shrub, bushy, 0.5-1.8 m tall.

Leaves: Alternate, oval to oblanceolate, tapering towards the base, dark green, somewhat glossy, 4-13 cm long.

Flowers: Inflorescence of axillary, nearly unstalked clusters; corollas lacking; calyces pale green, with 4 cylindrical, spreading lobes.

Fruits: Drupes, egg-shaped, black, 8-11 mm long.

ULMACEAE

ULMUS

***Ulmus pumila* L.**

Siberian elm

HABITAT/RANGE:

Moist to dry streambanks, lakesides and waste places in the steppe zone; infrequent in SC BC, known only from Osoyoos; introduced from Asia.

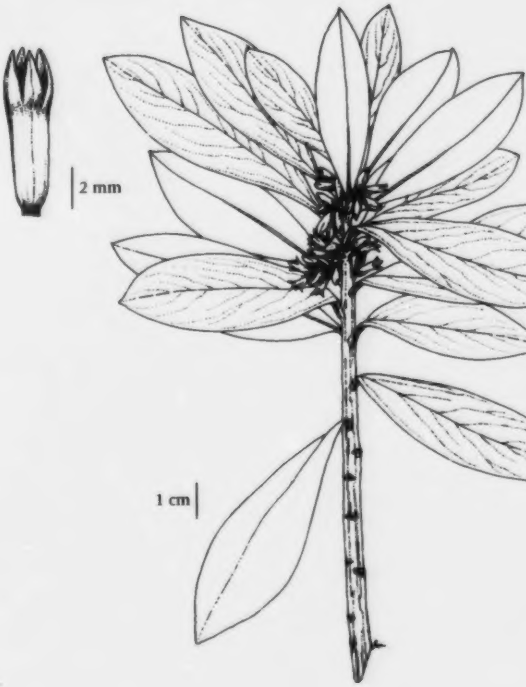
DESCRIPTION:

General: Deciduous shrubby tree; branches spreading, twigs hairless, up to 12 m tall.

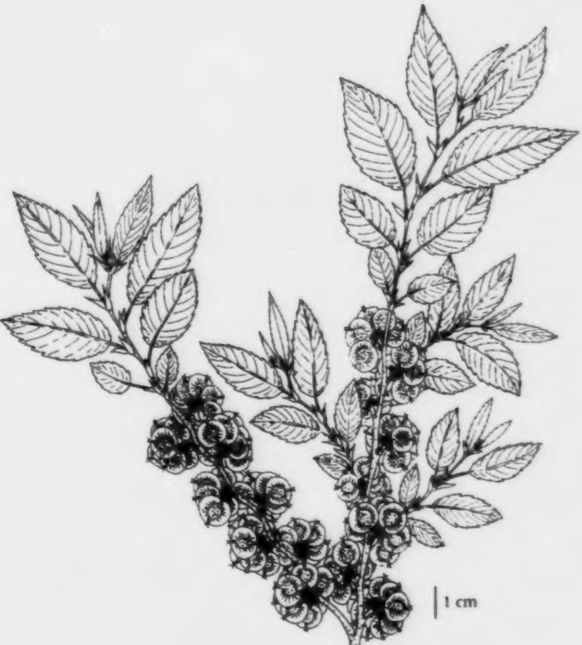
Leaves: Alternate, simple, elliptic to oblanceolate, smooth except hairy on the veins below margins toothed, dark green, 3-9 cm long, with stipules.

Flowers: Inflorescence of axillary racemes with flowers appearing before leaves in spring; corollas lacking; calyces bell-shaped, short-lobed, the lobes unequal.

Fruits: Samaras, 10-15 mm long, 10-12 mm wide, winged, the wings translucent.



Daphne laureola



Ulmus pumila

URTICACEAE

1. Plants with stinging bristles; leaves opposite, margins coarsely toothed .... *Urtica*
1. Plants without stinging bristles; leaves alternate, margins entire .... *Parietaria*

PARIETARIA

Parietaria pensylvanica **Muhl. *ex* Willd.**

Pennsylvania pellitory

HABITAT/RANGE:

Moist to mesic shaded areas and disturbed sites in the steppe and montane zones; infrequent in SC BC and rare in NE (Liard Hot Springs) and SW (Sumas Mountain) BC; E to PQ and ME, NH, NY, PA, NC, FL, MS, LA, TX, NM, AZ, CA, and MX.

DESCRIPTION:

General: Annual herb from a taproot; stems sprawling to erect, simple or branched, solitary, hairy, 15-60 cm tall/long.

Leaves: Basal leaves few, reduced, soon deciduous; stem leaves narrowly egg-shaped to elliptic, 1-9 cm long, slender-stalked, entire.

Flowers: Inflorescence of small axillary clusters from midstem to stem tip; corollas lacking; calyces dark reddish brown, erect, 1.5-2 mm long, 4-lobed, the lobes abruptly pointed; involucral bracts 3-4, 2-4 mm long, subtending the calyces.

Fruits: Achenes, brownish, smooth, shining, about 1 mm long.

URTICA

1. Plants tap-rooted annuals 10-80 cm tall; inflorescence in dense clusters of mixed male and female flowers; mature achenes triangular .... *U. urens*
1. Plants rhizomatous perennials 100-300 cm tall; inflorescence a panicle of either male or female flowers; mature achenes egg-shaped .... *U. dioica*

Urtica dioica **L.** (*U. dioica* ssp. *gracilis* var. *lyallii* [S. Wats.] C.L. Hitchc., var. *holosericea* [Nutt.] Thorne = ssp. *gracilis*)

stinging nettle

HABITAT/RANGE:

Moist to mesic streamsides, deciduous woodlands, thickets, avalanche tracks, and alluvial floodplains in the lowland and steppe to lower subalpine zones; ssp. *gracilis* – common throughout BC; ssp. *dioica* – rare in SW BC (lower Fraser Valley); ssp. *gracilis* – N to AK, YT and NT, E to NF and S to ME, NH, NY, PA, NC, MS, LA, TX, NM, AZ, CA, and MX; S America, ssp. *dioica* – introduced from Europe.

DESCRIPTION:

General: Perennial herb from strong rhizomes; stems erect, simple or branched, solitary, smooth except for a few stinging hairs and bristles, 100-300 cm tall.

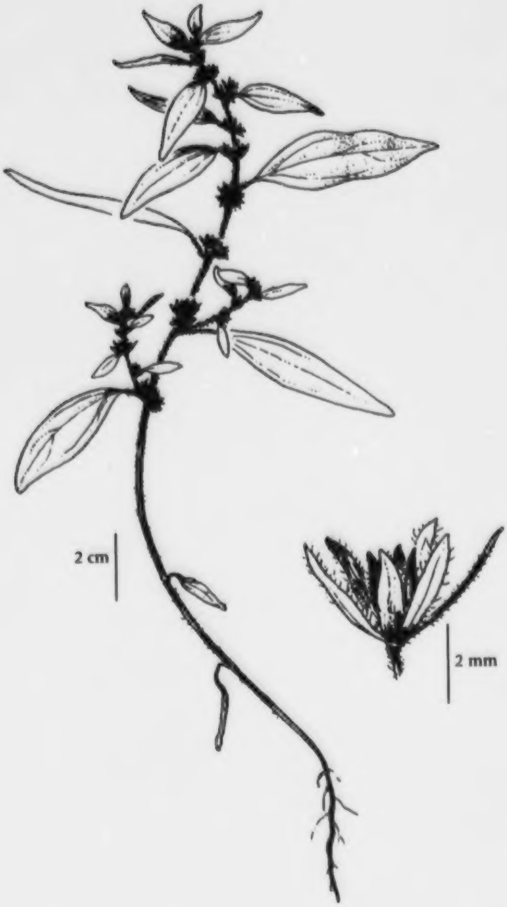
Leaves: Basal leaves lacking; stem leaves narrowly lanceolate to widely egg-shaped, opposite, the blades 7-15 cm long, coarsely toothed, stalked; stipules 5-15 mm long.

Flowers: Inflorescence of male or female flowers in a 1-7 cm axillary panicle on the same or different plants; corollas lacking; sepals 4, 1-2 mm long; female flowers usually uppermost.

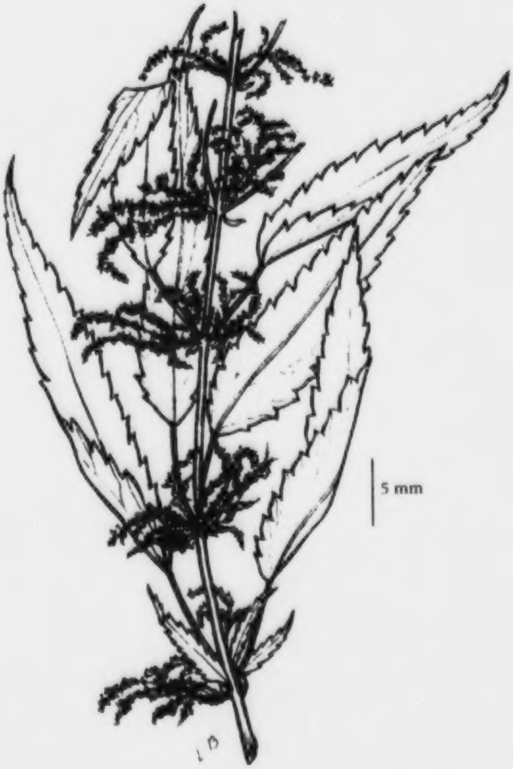
Fruits: Achenes, egg-shaped, flattened, 1.0-1.5 mm long.

Notes: The native taxon is best recognized as a single, highly variable subspecies (Bassett *et al.* 1974, Boufford 1997). Two subspecies occur in BC:

1. Male and female flowers on different plants .... ssp. *dioica*
1. Male and female flowers mostly on the same plant .... ssp. *gracilis* (Ait.) Seland



Parietaria pensylvanica



Urtica dioica ssp. *gracilis*

Urtica urens **L.**

dog nettle; burning nettle

HABITAT/RANGE:

Mesic to dry roadsides and waste places in the lowland, steppe and montane zones; rare in SW and SC BC south of 51° N; introduced from Eurasia.

DESCRIPTION:

General: Annual herb from a taproot; stems erect, simple or branched, solitary, sparsely to moderately hairy, with strongly stinging hairs and bristles, 10-80 cm tall.

Leaves: Basal leaves few, reduced or lacking; stem leaves elliptic to egg-shaped, often enlarged upwards, opposite, the blades 1-4 cm long, coarsely and deeply toothed, stalked, the stalks 0.3-3 cm long; stipules 2-3 mm long.

Flowers: Inflorescence of mixed male or female flowers in a 1-2 cm, axillary cluster or panicle; corollas lacking; sepals 4, 0.5-0.9 mm long.

Fruits: Achenes, egg-shaped, 1.5-1.8 mm long.

VALERIANACEAE

1. Plants perennials; leaves, or at least some of them, deeply lobed; calyces conspicuous .... *Valeriana*
1. Plants annuals; leaves entire or merely toothed; calyces minute or obsolete.
    2. Stems dichotomously branched above; fruits 3-celled but only 1-seeded; stigmas 3-lobed; corollas without spurs .... *Valerianella*
    2. Stems simple or with opposite axillary branches; fruits 1-celled, the sterile cells obsolete; stigmas 2-lobed, rarely 3-lobed; corollas with spurs .... *Plectritis*

PLECTRITIS

1. Convex side of fruits keeled, not grooved lengthwise, the fruits winged or not, the wing margins not thickened; corollas with a slender spur, the tip usually enlarged .... *P. congesta*
1. Convex side of fruits grooved lengthwise, not keeled, the fruits winged, the wing margins thickened; corollas with a thick spur, the tip not enlarged .... *P. macrocera*

Plectritis congesta **(Lindl.) DC.** (*P. anomala* [A. Gray] Suksd., *P. brachystemon* Fisch. & C.A. Mey., *P. congesta* ssp. *major* [Fisch. & C.A. Mey.] Morey, *P. samolifolia* [DC.] Hoeck = var. *major*)

sea blush; rosy plectritis

HABITAT/RANGE:

Mesic to vernally moist meadows or dry rocky sites in the lowland zone; common in SW BC, rare in the Queen Charlotte Islands; S to CA.

DESCRIPTION:

General: Annual herb from a taproot; stems erect, solitary, simple, smooth, 10-60 cm tall.

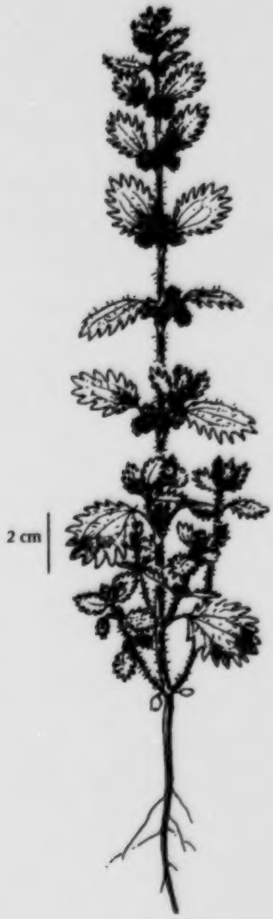
Leaves: Basal leaves soon deciduous; stem leaves opposite, lowermost leaves spoon-shaped or egg-shaped with short stalks, others more oblong or elliptic and stalkless, smooth, 1-6 cm long, 3-22 mm wide.

Flowers: Inflorescence of terminal, more or less headlike clusters; corollas white to pale or dark pink 1.5-9.5 mm long, 2-lobed, with a slender spur, the tip usually enlarged; calyces lacking.

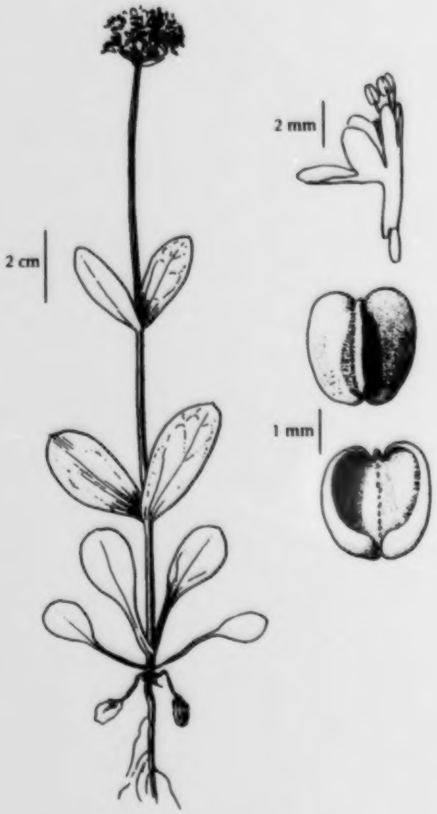
Fruits: Achenes, dry, 2-4 mm long, convex side of body usually keeled, not grooved lengthwise, winged or not, the wing margins not thickened, hairy near the tips or along the margins.

Notes: Two closely related varieties occur in our region:

1. Corollas 1.5-3.5 mm long, white to pale pink .... var. *major* (Fisch. & C.A. Mey.) Dyal
1. Corollas 4-9.5 mm long, pale to dark pink .... var. *congesta*



Urtica urens



Plectritis congesta

Plectritis macrocera **T.& G.** (*P. macrocera* ssp. *grayii* [Suksd.] Morey)

long-spurred plectritis

HABITAT/RANGE:

Vernally moist sites in the lowland, steppe and lower montane zones; infrequent in SW and SC BC, rare in SE BC; S to MT, UT, NV and CA.

DESCRIPTION:

General: Annual herb from a taproot; stems erect, solitary, simple, finely glandular, especially when flowering, otherwise smooth or nearly so, 10-60 cm tall.

Leaves: Basal leaves soon deciduous; stem leaves opposite, lowermost leaves egg-shaped with short-stalks, others more oblong or elliptic and stalkless, smooth or nearly so, 1-4.5 cm long, 3-18 mm wide.

Flowers: Inflorescence of terminal, more or less, cylindric clusters; corollas white or pale pink, 2-3.5 mm long, 2-lobed, with a thick spur, the tip not enlarged; calyces lacking.

Fruits: Achenes, dry, 2-4 mm long, convex side of body not keeled, grooved lengthwise, winged, the wing margins thickened, smooth or evenly hairy.

VALERIANA

1. Plants with stout, spindle-shaped taproots; leaves thickish, nearly parallel-ribbed; fruits egg-shaped; roots spindle-shaped .... *V. edulis*

1. Plants with fibrous roots; leaves relatively thin, net-veined; fruits lanceolate to narrowly oblong; roots fibrous.

    2. Lower leaves pinnately divided or compound, with 8-21 leaflets or segments, the terminal ones not much larger than the others .... *V. officinalis*

    2. Lower leaves undivided, or with only 1-4 leaflets or segments, the terminal ones the largest.

        3. Corollas usually 2-4 mm long, the spreading lobes about equalling the tube .... *V. dioica*

        3. Corollas usually 4-18 mm long, the ascending lobes much shorter than the tube.

            4. Upper stem leaves unstalked or nearly so, usually with 1 pair of lateral lobes .... *V. capitata*

            4. Upper stem leaves distinctly stalked, with 3-5 pairs of lateral lobes.

                5. Plants 30-120 cm tall; leaves mainly along the stems .... *V. sitchensis*

                5. Plants 10-70 cm tall; leaves mainly basal .... *V. scouleri*

Valeriana capitata **Pallas *ex* Link**

capitate valerian

HABITAT/RANGE:

Moist meadows, thickets and streambanks in the montane and subalpine zones; infrequent in N BC; circumpolar, N to AK, YT and NT; Eurasia.

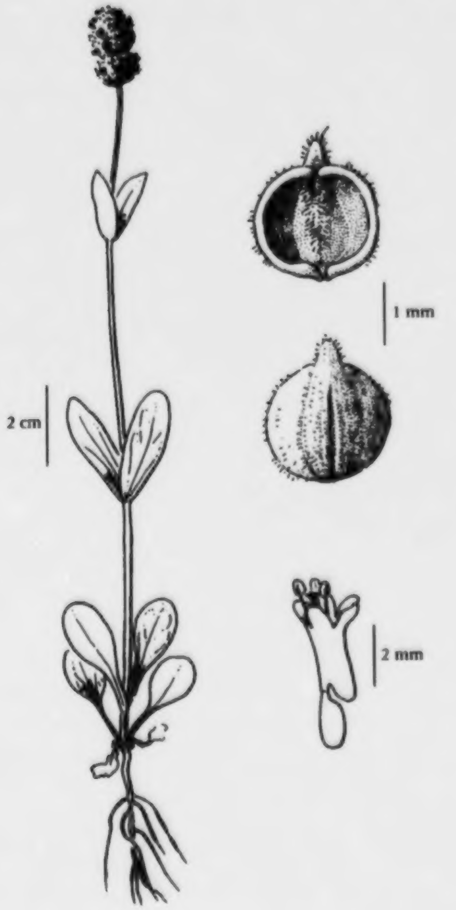
DESCRIPTIONS:

General: Perennial herb from a stout rhizome and fibrous roots; stems erect, solitary to few, simple, smooth or hairy below, 6-40 cm tall.

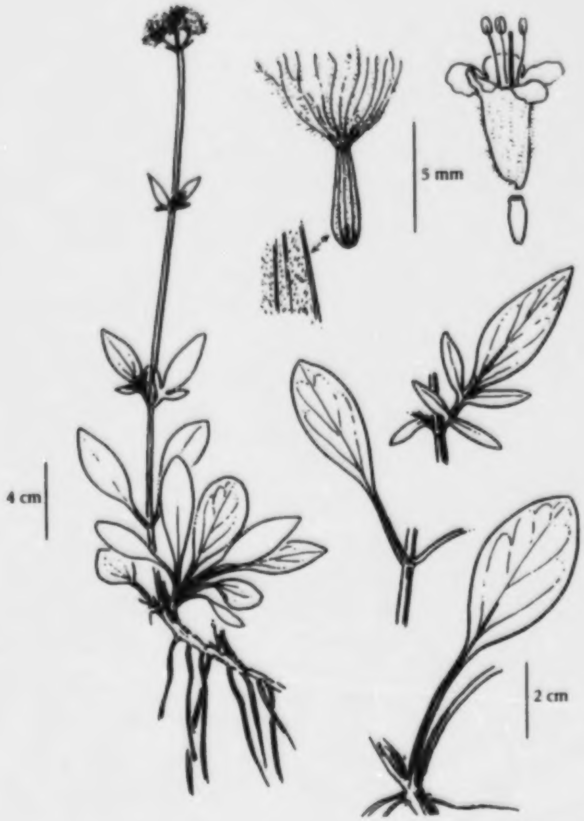
Leaves: Basal leaves simple, short-stalked; stem leaves opposite, irregulary toothed, 3-5.5 cm long, 1.5 cm wide, second node leaves with 1 pair of lateral lobes and unstalked or nearly so, terminal lobe lanceolate to egg-shaped, 1.5-6 cm long, 0.8-3 cm wide.

Flowers: Inflorescence a terminal, flat-topped cluster 1.5-3.5 cm wide, expanding with maturity; corollas pink to white, deeply lobed, 4-6 mm long; calyces with feathery segments.

Fruits: Achenes, 3-4 mm long.



Plectritis macrocera



Valeriana capitata

***Valeriana dioica* L. ssp. *sylvatica* (S. Wats. *ex* Richards.) F.G. Mey.** (*V. sylvatica* Soland. *ex* Richards. *non* Schmidt)
marsh valerian

HABITAT/RANGE:

Wet to moist meadows and streambanks in the montane and subalpine zones; frequent in BC east of the Coast-Cascade Mountains; N to YT and NT, E to NF and S to SD, WY, ID and WA.

DESCRIPTION:

General: Perennial herb from a stout branched rhizome or woody stem-base with fibrous roots; stems erect, solitary, simple below the inflorescence, smooth or nearly so, 10-40 cm tall.

Leaves: Basal leaves spoon-shaped to egg-shaped, up to 8 cm long and 3 cm wide, mostly simple, smooth, long-stalked; stem leaves opposite, 2-4 pairs, up to 5 cm long and 2.5 cm wide, pinnately cleft with 1-7 pairs of lateral lobes, the terminal lobe narrowly oblong, short-stalked or unstalked.

Flowers: Inflorescence a compact, round-topped cluster of either male and female or only female flowers; corollas white, 2-4 mm long, lobed, the lobes about equal to the tubes; calyces with 9-15 feathery segments; stamens well exserted.

Fruits: Achenes, lanceolate, 3-5 mm long, up to 2 mm wide, smooth.

Notes: The North American plants, recognized as ssp. *sylvatica*, are closely related to and not always easily distinguished from the Eurasian ssp. *dioica*.

Valeriana edulis* Nutt. *ex* T.& G. ssp. *edulis
edible valerian

HABITAT/RANGE:

Moist (sometimes saline) meadows in the steppe and montane zones; rare in SC BC; E to ON and S to SD, NM, AZ, NV and OR.

DESCRIPTION:

General: Perennial herb from a stout taproot and branched stem-base with fibrous roots; stems erect, solitary, simple, usually smooth, 10-120 cm tall.

Leaves: Basal leaves linear to egg-shaped, long-stalked, 7-40 cm long, 0.7-5 cm wide, simple or sometimes lobed; stem leaves opposite, 2-6 pairs, pinnately cleft with narrow segments, becoming unstalked, terminal lobe linear to narrowly lanceolate.

Flowers: Inflorescence a compact panicle of either male, female or both female and male flowers; female flowers 1 mm long and male or male/female flowers 2.5-3.5 mm long; corollas white, either about 1 mm long (female) or 2.5-3.5 mm long (male), lobed, the lobes slightly shorter than the tubes; calyces with mostly 9-13 feathery segments; stamens only slightly exserted.

Fruits: Achenes, egg-shaped, 2.5-4.5 mm long, short-hairy or nearly smooth.

***Valeriana officinalis* L.**
garden heliotrope; common valerian

HABITAT/RANGE:

Mesic to dry roadsides and disturbed sites; rare on S Vancouver Island and the adjacent mainland; introduced from Eurasia.

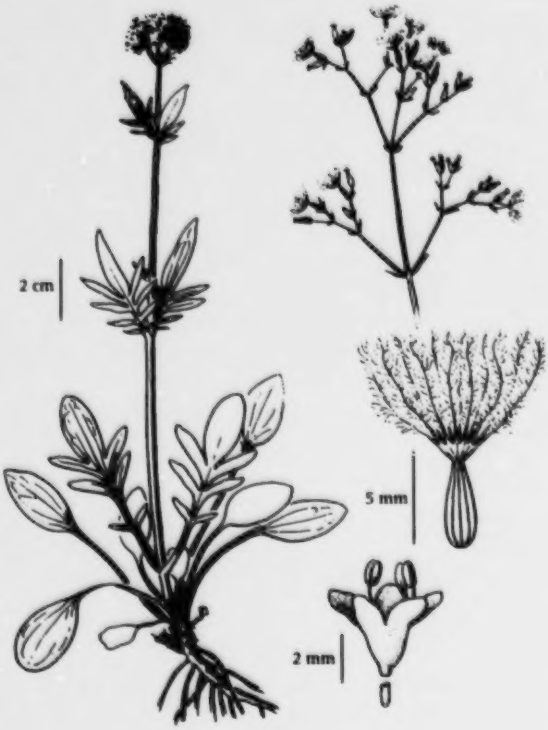
DESCRIPTION:

General: Perennial herb from a branched stem-base with fibrous roots; stems erect, clump-forming, fleshy, 60-100 cm tall.

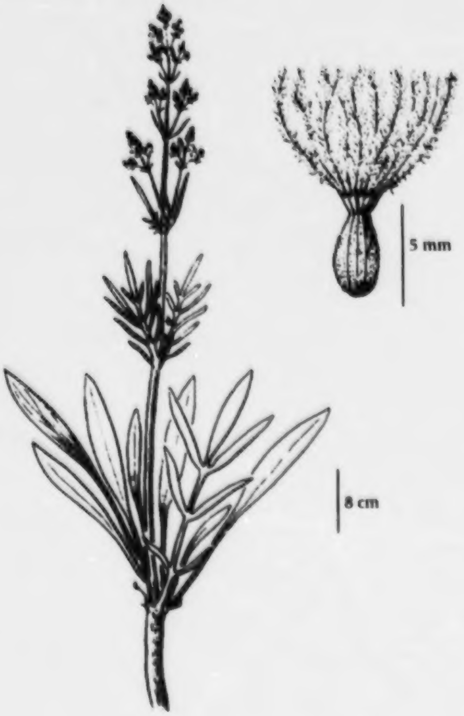
Leaves: Basal leaves lanceolate, pinnately divided into 8-21 leaflets with pointed tips, stalked, lower leaf surfaces hairy; stem leaves opposite, similar, not much reduced upwards, becoming short stalked upwards.

Flowers: Inflorescence a corymbose, open cyme with numerous flowers; corollas pinkish-white, 4 mm long, lobed, the lobes 1 mm long; calyces with feathery segments.

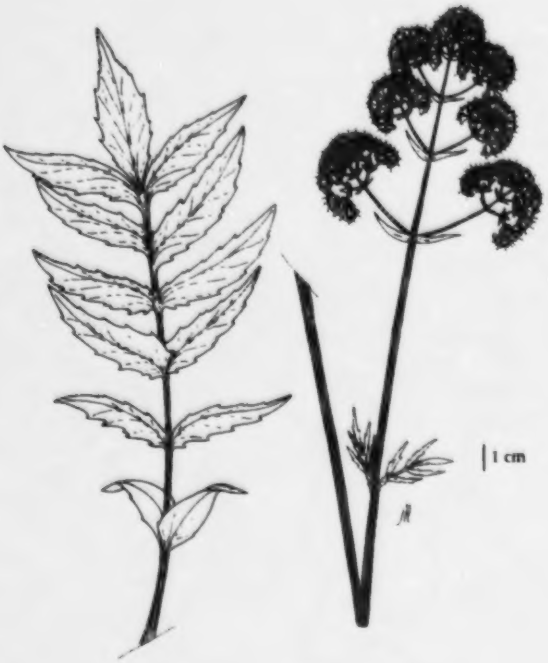
Fruits: Achenes, lance-oblong, 4.5-5 mm long, smooth.



Valeriana dioica ssp. *sylvatica*



Valeriana edulis ssp. *edulis*



Valeriana officinalis

Valeriana scouleri **Rydb.** (*V. sitchensis* ssp. *scouleri* [Rydb.] F.G. Mey.)

Scouler's valerian

HABITAT/RANGE:

Wet to moist woodlands, streamsides, cliffs and meadows in the lowland, steppe and montane zones; infrequent in SW BC south of 51° N, rare eastward; E to SW AB and S to NW CA.

DESCRIPTION:

General: Perennial herb from a stout rhizome or branched stem-base with fibrous roots; stems ascending to erect, solitary, simple, smooth except hairy at the nodes, 15-70 cm tall.

Leaves: Basal leaves spoon-shaped or pinnately cleft with 1-2 pairs of lateral segments up to 3 cm long and 1.5 cm wide, enlarged terminal segment up to 8 cm long and 4 cm wide, leaves stalked; stem leaves few, smaller, opposite, entire or slightly toothed, 2-4 pairs, short-stalked.

Flowers: Inflorescence a compact, flat-topped cluster with usually male/female flowers; corollas white or pink, 5-9 mm long, lobed, the lobes 1/2 as long as the tube; calyces with 12-18 feathery segments; stamens well exserted.

Fruits: Achenes, lanceolate to more oblong or linear, 5-6 mm long, 1-2 mm wide, smooth.

Valeriana sitchensis **Bong.**

Sitka valerian

HABITAT/RANGE:

Moist streambanks, meadows, forests and avalanche tracks in all but the lowland zone; common throughout BC; N to AK, YT and NT, E to AB and S to MT, ID and CA.

DESCRIPTION:

General: Perennial herb from a stout rhizome or branched stem-base with fibrous roots; stems smooth except short-hairy at the nodes, 30-120 cm tall.

Leaves: Basal leaves few, pinnately cleft with 1-2 pairs of lateral segments; stem leaves opposite, larger, with 1-4 pairs of lateral segments, enlarged terminal segment up to 10 cm long and 7 cm wide, usually coarsely toothed, leaves becoming short-stalked upwards.

Flowers: Inflorescence a compact, flat-topped cluster with usually male/female flowers; corollas white or pink, 4.5-7 mm long, lobed, the lobes 1/2 as long as the tube; calyces with 12-18 feathery segments; stamens well exserted.

Fruits: Achenes, egg-shaped to more oblong, 3-6 mm long, 2-2.5 mm wide, smooth.

VALERIANELLA

Valerianella locusta **(L.) Latt.**

cornsalad

HABITAT/RANGE:

Mesic to dry woodlands, meadows, roadsides, fields and waste places in the lowland zone; rare in S BC; introduced from Eurasia.

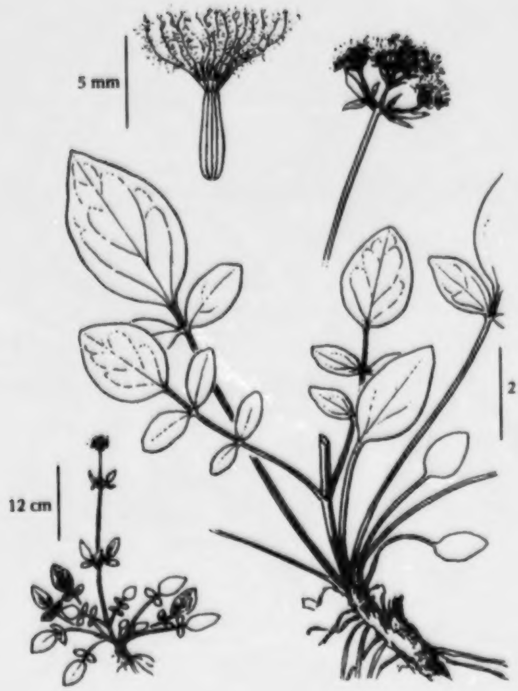
DESCRIPTION:

General: Annual herb from a taproot; stems ascending to erect, solitary, simple to branched, sparsely bristly-hairy, 10-40 cm tall.

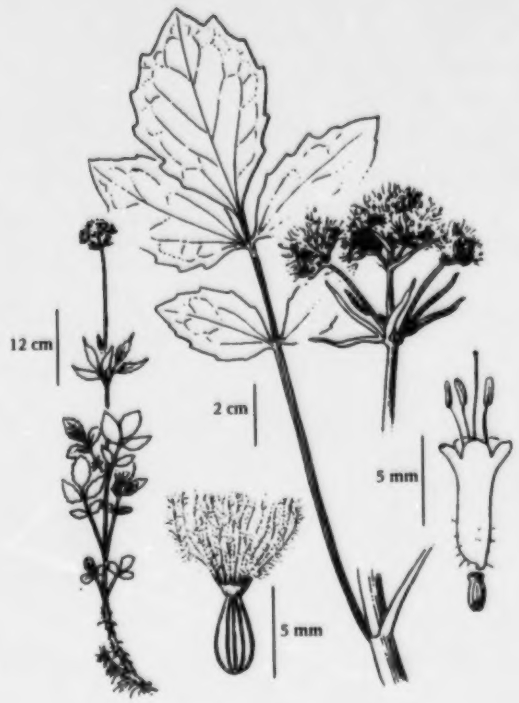
Leaves: Basal leaves few, spoon-shaped, soon deciduous; stem leaves opposite, lowermost widely lanceolate with stalks, others stalkless and more oblong, entire or somewhat irregularly toothed on uppermost leaves, 1-7 cm long, 3-18 mm wide, coarsely fringed and short-hairy.

Flowers: Inflorescence of several terminal flowers; corollas white, 1.5-2 mm long, lobed, the lobes bluish, about equal to the tube; calyces usually lacking; stamens 3.

Fruits: Achenes, 2-4 mm long, 3-chambered, 2 chambers sterile, the fertile chamber bearing a thick, corky mass on the back.


5 mm
2 cm
12 cm

Valeriana scouleri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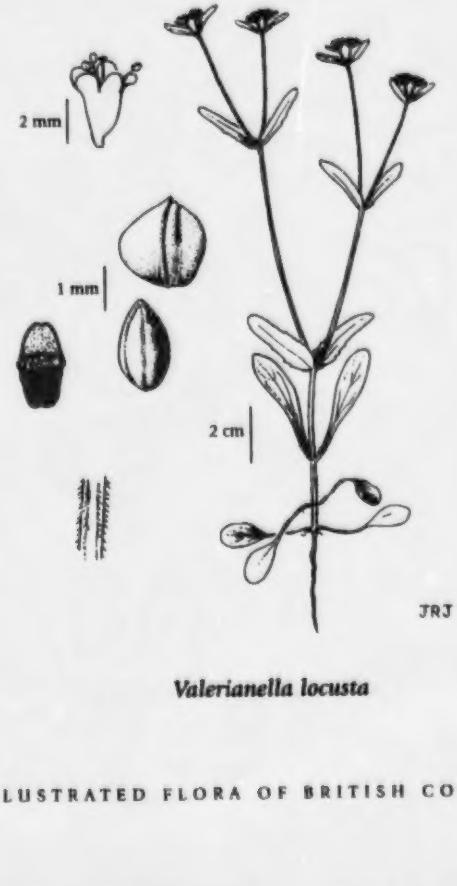
2 cm
5 mm
5 mm

Valeriana sitchensis


2 mm
1 mm
2 cm
JRJ

Valerianella locusta

VERBENACEAE

VERBENA

1. Plants usually prostrate or decumbent; leaves, or at least many of them, deeply cleft; bracts of the inflorescences conspicuous, exceeding the calyces .... *V. bracteata*

1. Plants erect; leaves merely toothed or shallowly lobed; bracts of the inflorescences inconspicuous, slightly surpassed by the calyces .... *V. hastata*

***Verbena bracteata* Lag. & Rodr.**

bracted vervain

HABITAT/RANGE:

Mesic to dry sandy sites, roadsides and disturbed areas in the steppe and montane zones; rare in SW BC, locally frequent in SC BC; E to ON and S to ME, NH, NY, PA, NC, FL, MS, LA, TX, NM, AZ, CA, and MX

DESCRIPTION:

General: Annual or more often perennial herb from a taproot; stems prostrate or decumbent, few to numerous, simple, spreading-hairy, 10-60 cm long.

Leaves: Basal leaves lacking; stem leaves opposite, oblanceolate, 2-5 cm long, 1-2.5 cm wide, coarsely bristly, wing-stalked, irregularly toothed and cleft with pinnate segments, the terminal segments larger.

Flowers: Inflorescence of terminal racemes up to 15 cm long with lance-linear bracts and inconspicuous flowers; corollas bluish or pinkish, sometimes white, 4-5 mm long, almost hidden by prominent bracts exceeding the calyces, lobed, the lobes about 1/4 the length of the tubes; calyces cylindric, 2.5-4 mm long, bristly-hairy.

Fruits: Nutlets, 1-2 mm long, with prominent ribs, cross-corrugated above.

***Verbena hastata* L. var. *scabra* Moldenke**

blue vervain

HABITAT/RANGE:

Moist to wet ditches, meadows and marshes in the lowland and steppe zones; rare in SW and SC BC; E to PQ and S to IN, MN, IO, TX, NM, AZ and CA.

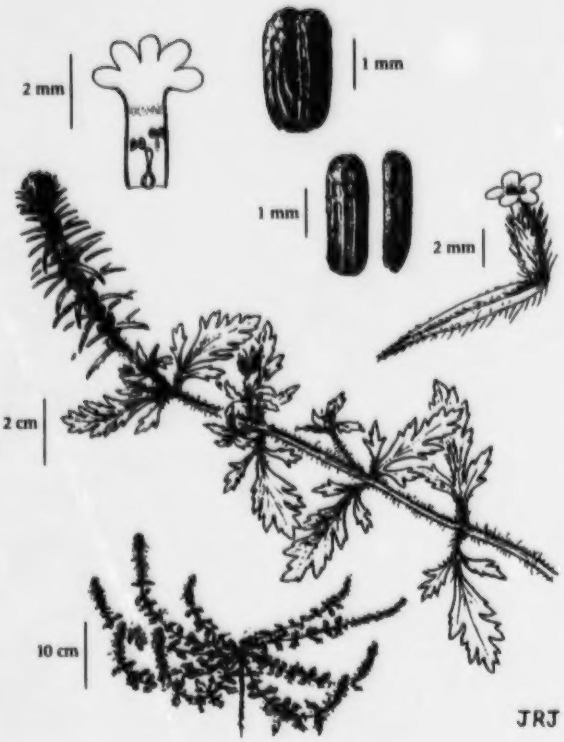
DESCRIPTION:

General: Perennial herb from a short stem-base with fibrous roots; stems erect, solitary, simple, usually bristly or spreading-hairy, 15-150 cm tall.

Leaves: Basal leaves lacking; stem leaves opposite, lanceolate, pointed at the tip, 4-15 cm long, 1-4 cm wide, sharply toothed, sometimes shallowly lobed, rarely with lobes at the base, short-hairy, short-stalked, the stalks 1-2 cm long.

Flowers: Inflorescence a flat-topped cluster of spikes 3-10 cm long with many flowers; corollas blue to violet, 2.5-5 mm long, lobed, the lobes about 1/3 the length of the tube; bracts inconspicuous; calyces egg-shaped, 2.5-3 mm long.

Fruits: Nutlets, 1.5-2 mm long, smooth or faintly lined.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1 mm
1 mm
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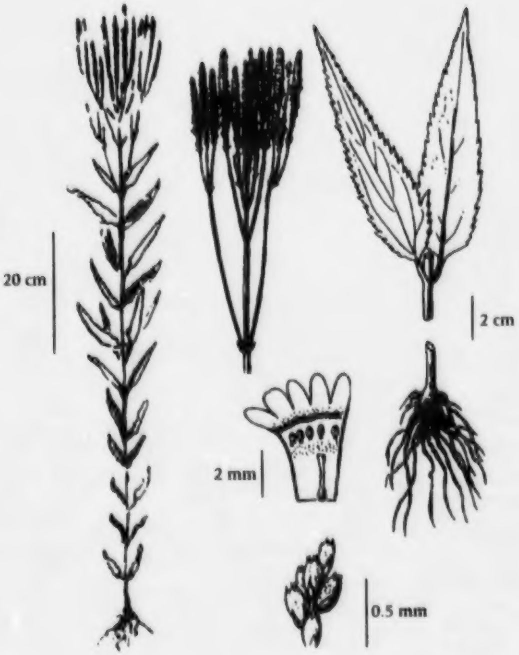
2 cm
10 cm
JRJ

Verbena bracteata


20 cm
2 cm
2 mm
0.5 mm

Verbena hastata var. *scabra*

VIOLACEAE

VIOLA[8]

1. Plants annuals, with leafy stems bearing large, deeply lobed leaflike stipules.

2. Petals blue-violet, sometimes yellow, much longer than the sepals .... *V. tricolor*

2. Petals cream, sometimes yellow, about the same length as the sepals .... *V. arvensis*

1. Plants perennials, lacking leafy stems or the stems not bearing large leaflike stipules.

3. Flowers yellow (backs of some petals may be brownish).

4. Leaf bases not heart-shaped, the blades mostly 1.5 to twice as long as wide.

5. Leaves coarsely few-toothed or -lobed, often purplish or the veins purple .... *V. purpurea*

5. Leaves entire or slightly wavy, not purplish or purple-veined.

6. Leaves smooth or sparsely hairy; seeds light brown; plants of SC BC .... *V. vallicola*

6. Leaves sparsely to densely hairy; seeds dark brown; plants of SE Vancouver Island and adjacent islands .... *V. praemorsa*

4. Leaf bases heart-shaped, the blades about as long as wide (as measured from the sinus).

7. Plants stoloniferous; leaves finely mottled with reddish-brown spots .... *V. sempervirens*

7. Plants not stoloniferous; leaves not mottled.

8. Sepals fringed in the upper half, and with a conspicuous purple-black stripe; style heads smooth .... *V. biflora*

8. Sepals not fringed, lacking a purple-black stripe; style heads bearded.

9. Leaves heart-shaped to kidney-shaped, the tips pointed; flowers located near the top of leafy stems .... *V. glabella*

9. Leaves round, the tips rounded, the base heart-shaped; flowers not confined to the top of leafy stems .... *V. orbiculata*

3. Flowers violet, blue, lilac, pinkish, white or cream.

10. Petals white or cream with no bluish tinge, the lower ones sometimes with fine purple lines.

11. Leaves lanceolate, 3-6 times longer than wide; bases wedge-shaped .... *V. lanceolata*

11. Leaves egg-shaped, triangular, kidney-shaped or round; bases heart-shaped.

12. Leaves and/or sepals fringed.

13. Plants with obvious leafy stems at time of flowering; styles not hooked; petals white and yellow-based .... *V. canadensis*

13. Plants lacking leafy stems; styles conspicuously hooked downwards at the end; petals white with a violet spur .... *V. odorata*

12. Leaves and sepals not fringed.

14. Petals usually tinged with some violet or blue on the back .... *V. palustris*

14. Petals pure white or with some purplish penciling.

15. Plants with stolons; leaves smooth .... *V. macloskeyi*

15. Plants without stolons; leaves hairy at least on the lower surface and leaf stalks .... *V. renifolia*

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[8] Key adapted from Packer (1991).

10. Petals violet, blue, lilac, lavender or pinkish.

16. Plants with obvious leafy stems at time of flowering.

17. Stipules ragged or sharp-toothed (at least basally), reddish-brown or greenish with reddish-brown flecks.

18. Sepals fringed .... *V. howellii*

18. Sepals not fringed .... *V. adunca*

17. Stipules wax-papery, white or greenish, more or less entire.

19. Capsules hairy; leaves fringed .... *V. canadensis*

19. Capsules smooth; leaves not fringed .... *V. langsdorfii*

16. Plants lacking obvious leafy stems at time of flowering.

20. Plants with stolons.

21. Leaves hairy; styles conspicuously hooked downwards at the tip .... *V. odorata*

21. Leaves smooth; styles not hooked.

22. Bracts on the flower stalk inserted below the middle; usually 3 or more leaves produced with the flowers; leaves round, kidney-shaped or egg-shaped, 2.5-5 cm long in flower, to 7.0 cm long in fruit .... *V. palustris*

22. Bracts on the flower stalk inserted above the middle; usually only 2 leaves produced with the flowers; leaves egg-shaped, 1.0-2.5 cm long in flower, to 3.5 cm long in fruit .... *V. epipsila*

20. Plants without stolons.

23. Sepals conspicuously fringed .... *V. septentrionalis*

23. Sepals not fringed.

24. Stipules joined to the leaf stalks; petals not bearded; leaves hairy on the upper surface .... *V. selkirkii*

24. Stipules not joined to the leaf stalks; at least the 2 lateral petals bearded; leaves essentially smooth.

25. Plants without leafy stems .... *V. nephrophylla*

25. Plants with leafy stems.

26. Stipules jagged or sharp-toothed (at least basally), reddish-brown or greenish, often with reddish brown flecks; lower petal 8-16 mm long including the 4-8 mm long spur .... *V. adunca*

26. Stipules entire, white or greenish; lower petal 14-24 cm long including the 3-4 mm long spur .... *V. langsdorfii*

***Viola adunca* J.E. Smith var. adunca** (*V. adunca* var. *bellidifolia* [Greene] Harrington, *V. bellidifolia* Greene)

early blue violet

HABITAT/RANGE:

Dry to moist open woods, meadows, and roadsides; common throughout BC in all vegetation zones; N to S AK, YT and NT, E to PQ and NS and S to ME, NY, MI, MN, IO, SD, NM, UT, NV and CA.

DESCRIPTION:

General: Perennial herb from a rhizome, without stolons; stems lacking in spring but developing aerial stems as the season progresses, ascending, usually hairy, 2-10 cm tall.

Leaves: Basal leaves egg-shaped to heart-shaped, the margins blunt-toothed, the blades 0.5-4 cm long, smooth or hairy, the stalks 5-7 cm long; stem leaves similar, sometimes few; stipules jagged or sharp-toothed (at least basally), reddish-brown or greenish, often with reddish-brown flecks, 3-10 mm long.

Flowers: Inflorescence of single, axillary flowers; petals 5, blue to deep violet, lower petal 8-16 mm long including the 4- to 8-mm long spur, the spur not pouched, lowest 3 petals often whitish with purple markings, lateral pair white-bearded; sepals 5, lanceolate, 1/3 to 1/2 as long as the petals; style heads bearded with short to long hairs.

Fruits: Capsules, smooth, 6-11 mm long; seeds dark brown.

Notes: A highly variable species in which a number of morphological phases have received dubious taxonomic recognition. A compact, dwarf form, smooth, with dark blue flowers, that occurs sporadically at high elevations has been described as var. *bellidifolia* (Greene) Harrington.

***Viola arvensis* Murr.**

European field pansy

HABITAT/RANGE:

Mesic to dry waste places and roadsides in the lowland zone; infrequent in S BC; introduced from Europe.

DESCRIPTION:

General: Annual herb from a taproot, without stolons; stems erect to prostrate, 5-35 cm tall/long.

Leaves: Basal leaves egg-shaped to lanceolate, coarsely wavy-toothed, the blades 1-3 cm long, hairy, the stalks 0.5-3 cm long; stem leaves similar; stipules leaflike, 8-14 mm long, deeply lobed, the lobes 5-9, the terminal lobe largest.

Flowers: Inflorescence of single, axillary flowers; petals 5, creamy white or pale yellow with tinges of blue, the lower petal 7-15 mm long including the 2- to 4-mm long spur, the spur not pouched; sepals 5, broadly lanceolate, equal to or slightly shorter than the petals; style heads densely short-bearded.

Fruits: Capsules, globose, smooth, 5-7 mm long; seeds brown.

***Viola biflora* L. ssp. *carlottae* Calder & Taylor**

Queen Charlotte twinflower violet

HABITAT/RANGE:

Moist rock outcrops and meadows in the montane to alpine zones; frequent on the Queen Charlotte Islands, rare on NW Vancouver Island; N to SE AK.

DESCRIPTION:

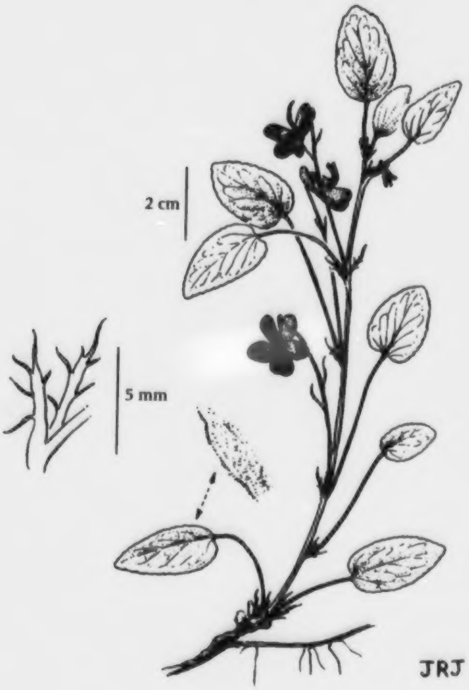
General: Perennial herb from a rhizome and fibrous roots, without stolons; stems ascending to erect, smooth, leafless except on the uppermost section, 5-20 cm tall.

Leaves: Basal leaves rounded to heart- or kidney-shaped, blunt- to saw-toothed, the blades 0.6-2 cm long, 1-3 cm wide, the stalks 8-16 cm long, hairy above and along the veins; stem leaves similar, the stalks shorter, equal to or longer than the blades; stipules lanceolate, 2-5 mm long, entire.

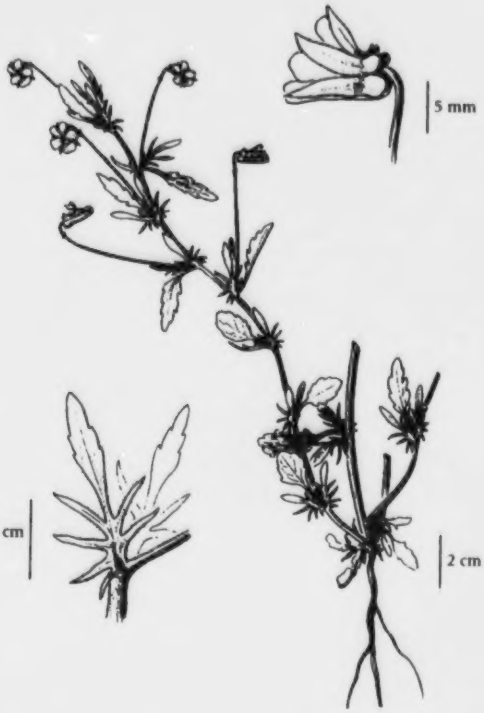
Flowers: Inflorescence of single, axillary flowers; petals 5, yellow, the lower petal 9-12 mm long including the 1- to 2-mm long spur; flower stalks with distinctive purple lines; sepals 5, oblong, fringed in the upper half, and with a conspicuous purple-black stripe; style heads smooth.

Fruits: Capsules, sparsely short-hairy, 8-12 mm long; seeds brown.

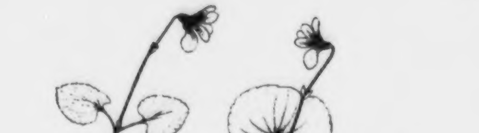
Notes: Hybridizes with *V. glabella*. The other subspecies, ssp. *biflora*, is widely distributed in Eurasia and also occurs in AK, YT and CO.



Viola adunca



Viola arvensis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5 cm
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Viola biflora ssp. *carlottae*

***Viola canadensis* L. var. *rugulosa* (Greene) C.L. Hitchc.** (*V. canadensis* ssp. *rydbergii* [Greene] House)

Canada violet

HABITAT/RANGE:

Moist to dry woodlands, open forests and meadows in the lowland and montane zones; common throughout BC, except absent in extreme NW BC; N to AK, YT and NT, E to PQ and S to IL, IO, NE, NM, AZ, ID and OR.

DESCRIPTION:

General: Perennial herb from a rhizome, usually with stolons; stems erect, smooth to hairy, 10-40 cm tall.

Leaves: Basal leaves heart-shaped, toothed, smooth to hairy, the blades 5-9 cm long, 6-12 cm wide, the stalks 15-30 cm long, smooth to hairy; stem leaves similar, the stalks shorter than the blades; stipules lanceolate, 1-2 cm long, entire or fringed.

Flowers: Inflorescence of single, axillary flowers; petals 5, white, yellow-based, the lower petal 12-24 mm long including the 1- to 2-mm long spur, the lower 3 usually purplish pencilled, the lateral pair bearded; sepals 5, lanceolate, usually fringed or hairy; style heads bearded.

Fruits: Capsules, egg-shaped, granular to short-hairy; seeds brown.

***Viola epipsila* Ledeb. ssp. *repens* W. Beck.** (*V. achyrophora* Greene, *V. epipsiloides* Löve & Löve)

dwarf marsh violet

HABITAT/RANGE:

Moist to wet bogs, meadows, marshes and streambanks in the subalpine and alpine zones; locally frequent in N BC; amphiberingian, N to AK, YT and NT; E Asia.

DESCRIPTION:

General: Perennial herb from a rhizome, with stolons, 10-15 cm tall/long; stems lacking.

Leaves: Basal leaves heart-shaped to kidney-shaped, smooth, 1.0-2.5 cm long in flower, to 3.5 cm long in fruit, the margins blunt-toothed; stipules lanceolate, entire, papery; bracts on the flowering stalk inserted above the middle and only 2 leaves produced with the flowers; stem leaves lacking.

Flowers: Inflorescence of single, axillary flowers; petals 5, violet to lilac, the lower petal 9-16 mm long including the 2- to 3-mm long spur, the lower 3 usually with darker lines, the lateral pair smooth to sparsely bearded; sepals 5, narrowly egg-shaped; style heads smooth.

Fruits: Capsules, elliptical, smooth; seeds brown.

Notes: As evident from the confusion existing in the current literature the relationships among *V. epipsila* ssp. *repens*, *V. palustris* and *V. pallens* require a critical investigation (Packer 1991). The main concern in BC is with *V. epipsila* ssp. *repens* and *V. palustris*, which intergrade and are often difficult to separate. Some Russian and North American taxonomists regard *V. epipsila* ssp. *repens* to be a quite distinct species and their name for our species would be *V. achyrophora* (*V. epipsiloides*).

***Viola glabella* Nutt.**

stream violet; yellow wood violet

HABITAT/RANGE:

Mesic to moist streambanks, woodlands and forests in the lowland to alpine zones; frequent in BC south of 56° N; N to S AK, E to AB and S to MT, ID and CA.

DESCRIPTION:

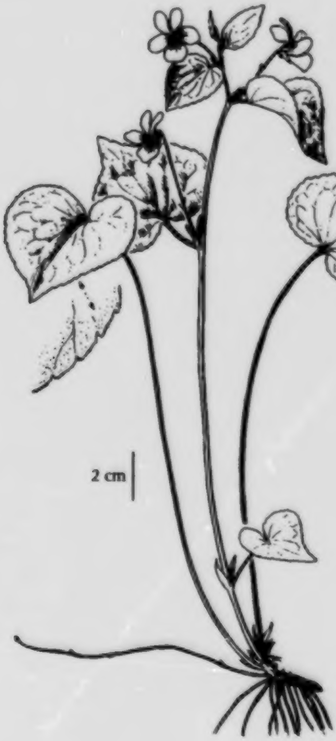
General: Perennial herb from a scaly, fleshy rhizome, without stolons; ascending to erect, smooth, 5-30 cm tall.

Leaves: Basal leaves heart-shaped to kidney-shaped, toothed, smooth, the blades 5-9 cm long, 4-8 cm wide, the stalks 2.5-25 cm long, smooth; stem leaves similar, the stalks from shorter than to slightly longer than the blades; stipules egg-shaped, 0.5-1 cm long, entire.

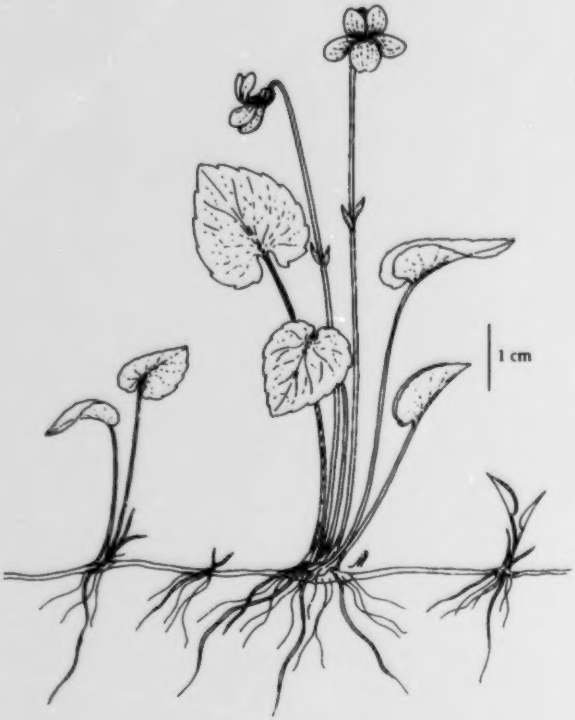
Flowers: Inflorescence of single, axillary flowers; petals 5, deep yellow, the lower petal 8-14 mm long including the 1- to 2-mm long spur, the lower 3 purplish-pencilled within, the lateral pair bearded; sepals 5, lanceolate; style heads densely bearded.

Fruits: Capsules, smooth, 7-17 mm long; seeds brown to black.

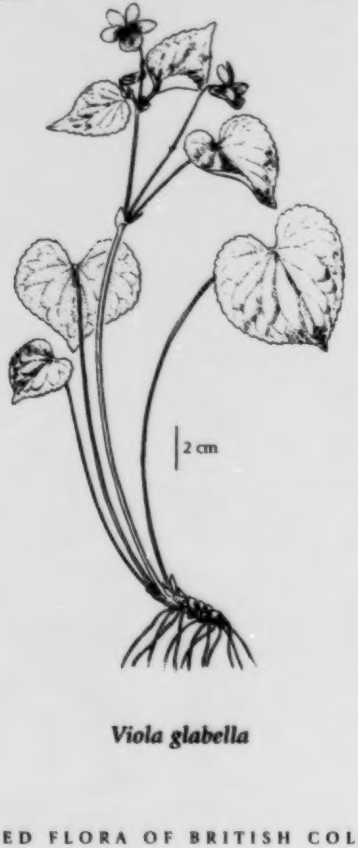
Notes: Hybridizes with *V. biflora* ssp. *carlottae* on the Queen Charlotte Islands.



Viola canadensis var. *rugulosa*



Viola epipsila ssp. *repens*



Viola glabella

***Viola howellii* A. Gray**

Howell's violet

HABITAT/RANGE:

Mesic to moist woodlands and forests in the lowland zone; rare on S Vancouver Island and the lower Fraser Valley; S to OR.

DESCRIPTION:

General: Perennial herb from a scaly, thick rhizome, without stolons; stems erect, sparsely hairy, 2-10 cm tall.

Leaves: Basal leaves heart- to kidney-shaped, toothed, smooth to short-hairy, the blades 2-4 cm long, 1.5-4 cm wide, the stalks 10-15 cm long, smooth; stem leaves similar, the stalks from shorter than to slightly longer than the blades; stipules narrowly oblong, 3-10 mm long, sharp-toothed.

Flowers: Inflorescence of single, axillary flowers; petals 5, bluish-violet (white at the base) to white, the lower petal 15-20 mm long including the 2- to 4-mm long, pouched spur, the lower 3 strongly purplish-veined, the lateral pair white-bearded; sepals 5, fringed, oblong, with earlike lobes at the base; style heads sparsely bearded.

Fruits: Capsules, smooth; seeds light brown.

Viola lanceolata* L. ssp. *lanceolata

lance-leaved violet

HABITAT/RANGE:

Moist woodlands and peaty fields in the lowland zone; rare in SW BC, known only from Lulu Island; introduced from E North America.

DESCRIPTION:

General: Perennial herb from a rhizome, with stolons; stems almost lacking, smooth, 5-15 cm tall.

Leaves: Basal leaves lanceolate to elliptic, toothed, smooth, the blades 3-6 cm long, 0.5-1.5 cm wide, bases wedge-shaped, the stalks reddish, equal to the leaves; stipules linear-lanceolate, 1 cm long, slender toothed.

Flowers: Inflorescence of single, axillary flowers; petals 5, white, the lower petal 8-11 mm long including the 1- to 2-mm long spur; the lower 3 purple-pencilled, the lateral pair not bearded; sepals 5, lanceolate; style heads smooth.

Fruits: Capsules, elliptic, smooth, 6-8 mm long; seeds brown.

***Viola langsdorfii* Fisch. *ex* Gingins**

Alaska violet

HABITAT/RANGE:

Bogs, fens and mesic to moist, meadows, streambanks and scree slopes in the montane to alpine zones; frequent in W BC, rare in EC BC; amphiberingian, N to AK and S to OR; NE Asia.

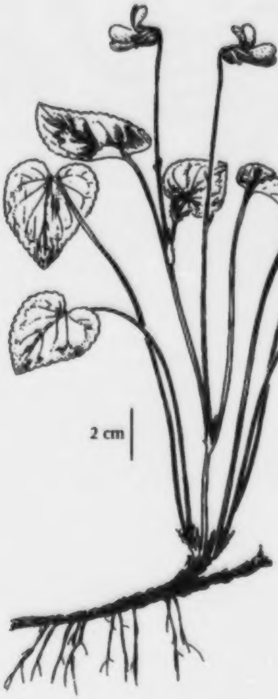
DESCRIPTION:

General: Perennial herb from a rhizome, without stolons; stems erect, smooth or sometimes sparsely hairy, 2-15 cm tall.

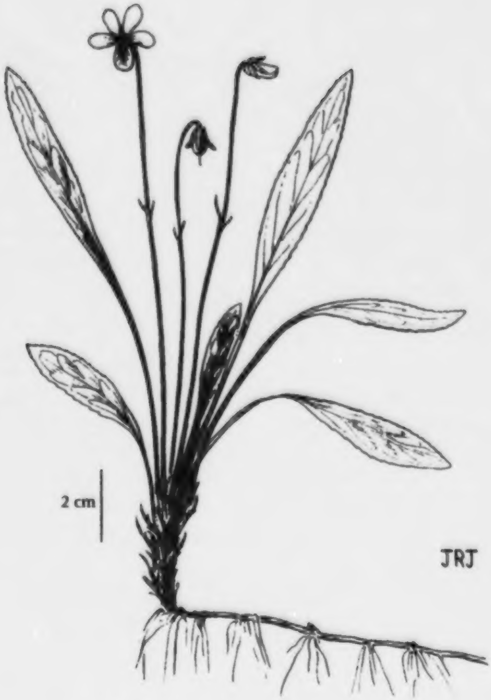
Leaves: Basal leaves heart-shaped to circular, toothed, smooth to short-hairy on the upper surface, the blades 1.5-5 cm long, 2-5 cm wide, the stalks 6-15 cm long, smooth; stem leaves lacking or few, similar, the stalks much longer than the blades; stipules lanceolate to egg-shaped, entire or remotely glandular-toothed, 3-10 mm long.

Flowers: Inflorescence of single, axillary flowers; petals 5, violet, the lower petal 15-25 mm long including the 2- to 4-mm long pouched spur, the lower 3 whitish-based, the lateral pair white-bearded; sepals 5, lanceolate; style heads smooth or bearded.

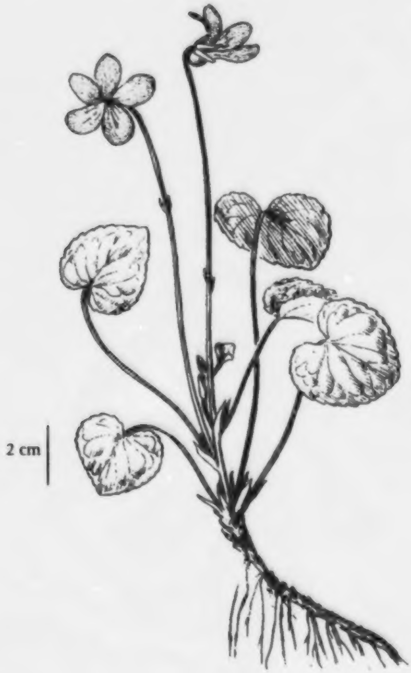
Fruits: Capsules, smooth; seeds brown.



Viola howellii



Viola lanceolata ssp. *lanceolata*



Viola langsdorfii

Viola macloskeyi **Lloyd** (*V. macloskeyi* ssp. *pallens* [Banks *ex* DC.] Baker, *Viola pallens* [Banks *ex* DC.] Brainerd, *V. palustris* L. ssp. *brevipes* Baker)

small white violet

HABITAT/RANGE:

Moist to wet streambanks, seepage sites, bogs and woodlands in the montane zone; frequent throughout BC, absent in NE BC and the Queen Charlotte Islands; N to NT, E to Labr. and NF and S to ME, NH, PA, GA, AL, MS, CO, UT, NV and CA.

DESCRIPTION:

General: Perennial from a rhizome, with stolons, plants 3-6 cm tall; stems lacking.

Leaves: Basal leaves heart-shaped, the blades 1-3 cm long, 0.7-2.5 cm wide, nearly entire to round-toothed, smooth, the stalks 2-4 cm long; stem leaves lacking; stipules lanceolate, membranous, glandular-toothed.

Flowers: Inflorescence of single, axillary flowers; petals 5, white, the lower petal 5-12 mm long including the 1- to 3-mm long spur, the lower 3 usually purple-pencilled, the lateral pair sometimes not bearded; sepals 5, lanceolate; style heads smooth.

Fruits: Capsules, smooth, 5-9 mm long; seeds brown to nearly black.

Viola nephrophylla **Greene** (*V. maccabeiana* Baker, *V. cognata* Greene)

northern bog violet

HABITAT/RANGE:

Moist to wet meadows, thickets, marshes, open woodlands and streambanks in the montane to alpine zones; frequent in SE BC, rare northward, absent along the Coast N of 50° N; N to NT, E to NF and S to ME, NH, PA, WV, IN, IO, LA, TX, NM, AZ and CA.

DESCRIPTION:

General: Perennial from a thickened rhizome, without stolons, plants up to 25 cm tall; stems lacking.

Leaves: Basal leaves heart-shaped to triangular, toothed, smooth or nearly so, the blades 3.5-7 cm long, 3-5 cm wide, the stalks 5-25 cm long; stem leaves lacking; stipules linear-lanceolate, entire.

Flowers: Inflorescence of single, axillary flowers; petals 5, bluish-violet, the lower petal 10-20 mm long including the 2- to 3-mm long pouched spur, the lower 3 bearded and more or less whitish at the base, the lateral pair sometimes not bearded; sepals 5, lanceolate; style heads smooth.

Fruits: Capsules, smooth, 8-10 mm long; seeds brown.

Notes: Two varieties occur in BC:

1. All petals bearded .... var. *cognata* (Greene) C.L. Hitchc.

1. Only the lower three petals bearded .... var. *nephrophylla*

Viola odorata **L.**

sweet violet

HABITAT/RANGE:

Mesic to dry roadsides and waste places in the lowland zone; infrequent on SE Vancouver Island, Galiano Island and the Vancouver area; introduced from Europe.

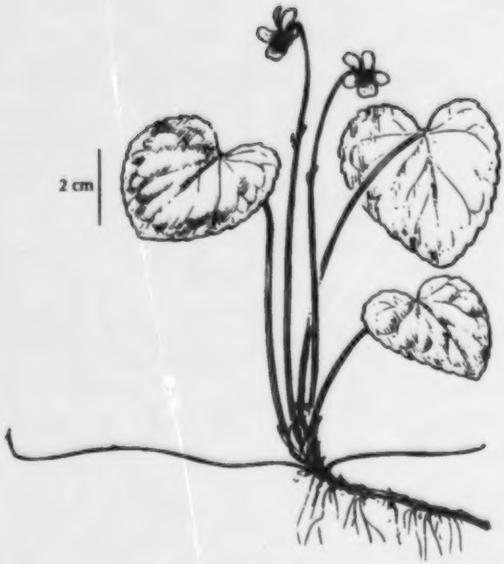
DESCRIPTION:

General: Perennial herb from a rhizome, with stolons, plants up to 15 cm tall; stems lacking.

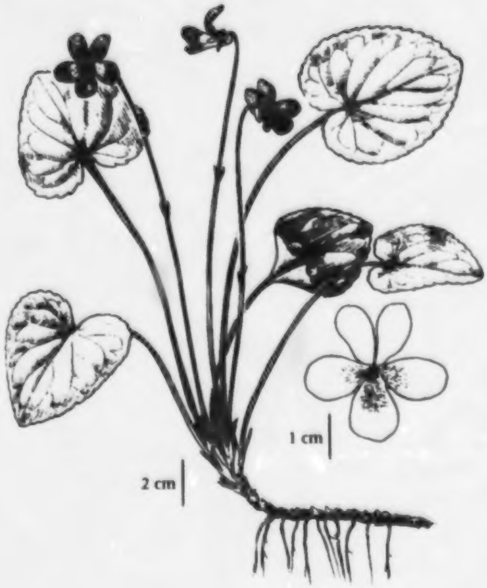
Leaves: Basal leaves heart-shaped, toothed, the blades 2-6 cm long, 1.5-5 cm wide, the stalks up to 12 cm long, smooth or finely hairy; stem leaves lacking; stipules lanceolate, entire.

Flowers: Inflorescence of single, axillary flowers; petals 5, white to violet, the lower petal 1.2-1.6 cm long including the 3- to 4-mm long pouched spur, the lower 3 not bearded, the lateral pair usually bearded; sepals 5, lanceolate; style heads hooked.

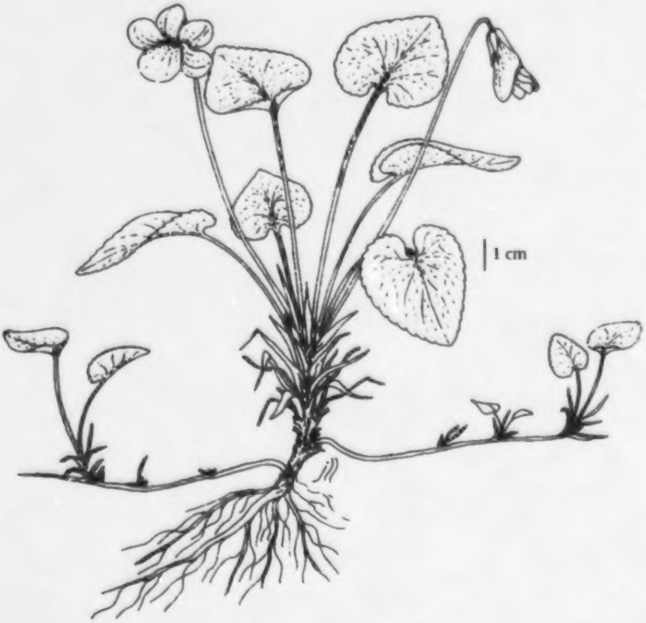
Fruits: Capsules, smooth; seeds cream-coloured.



Viola macloskeyi



Viola nephrophylla var. *nephrophylla*



Viola odorata

Viola orbiculata **Geyer *ex* Holz.**

round-leaved violet; evergreen yellow violet

HABITAT/RANGE:

Mesic to moist meadows and forests the montane to alpine zones; frequent in BC south of 56° N, absent in the Queen Charlotte Islands; E to AB, and S to WY, ID and OR.

DESCRIPTION:

General: Perennial from a scaly rhizome, without stolons; stems erect, smooth, 3-5 cm tall.

Leaves: Basal leaves evergreen (or at least some of them), round, bases deeply heart-shaped, toothed, smooth, the blades 1.5-4 cm long, 2-4 cm wide, the stalks up to 5 cm long; stem leaves similar, reduced; stipules lanceolate, entire.

Flowers: Inflorescence of single, axillary flowers; petals 5, yellow, the lower petal 0.5-1.5 cm long including the 1- to 2-mm long spur, the lower 3 purplish-pencilled, the lateral pair yellow-bearded; sepals 5, lanceolate; style heads short-bearded.

Fruits: Capsules, smooth; seeds brown.

Viola palustris **L. var. *palustris***

marsh violet

HABITAT/RANGE:

Moist to wet streambanks, meadows, swamps, fens and woodlands from the lowland to subalpine zones; common throughout BC except the extreme NE; N to NT, E to NF and S to ME, NY, SD, WY, UT, NV and CA.

DESCRIPTION:

General: Perennial herb from a rhizome, with stolons, plants 5-20 cm tall; stems lacking.

Leaves: Basal leaves round to heart- or kidney-shaped, the blades 2-7 cm long, 2.5-3.5 cm wide, round-toothed, smooth, the stalks up to 15 cm long; stem leaves lacking; stipules lanceolate, entire.

Flowers: Inflorescence of single, axillary flowers; petals 5, white to lavender, the lower petal 10-13 mm long including the 2-to 4-mm long pouched spur, the lower 3 purple-pencilled and more or less tinged with lilac, the lateral pair sparsely or not bearded; sepals 5, lanceolate, with earlike lobes at the base; style heads smooth.

Fruits: Capsules, smooth, 6-7 mm long; dark brown.

Viola praemorsa **Dougl. *ex* Lindl. ssp. *praemorsa*** (*V. nuttallii* Pursh var. *praemorsa* [Dougl. *ex* Lindl.] S. Wats.)

yellow montane violet

HABITAT/RANGE:

Dry grassy slopes and oak woodlands in the lowland zone; rare on SE Vancouver Island and adjacent islands; S to CA.

DESCRIPTION:

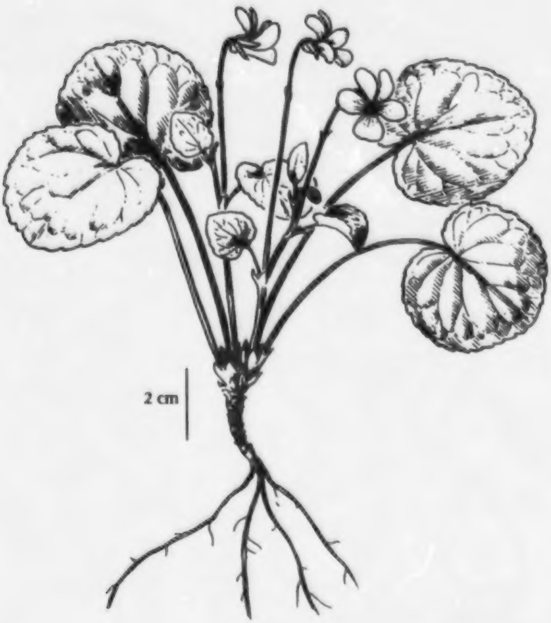
General: Perennial herb from a fibrous root, without stolons; stems erect, sparsely to densely hairy, largely underground but the aerial stems 6-30 cm tall.

Leaves: Basal leaves egg-shaped to lanceolate, entire or slightly wavy, sparsely to densely hairy, the blades 2-10 cm long, 1-3.5 cm wide, the stalks 3-15 cm long; stem leaves lacking or few, similar; stipules joined to the stem with the free end entire to toothed, sparsely to densely hairy.

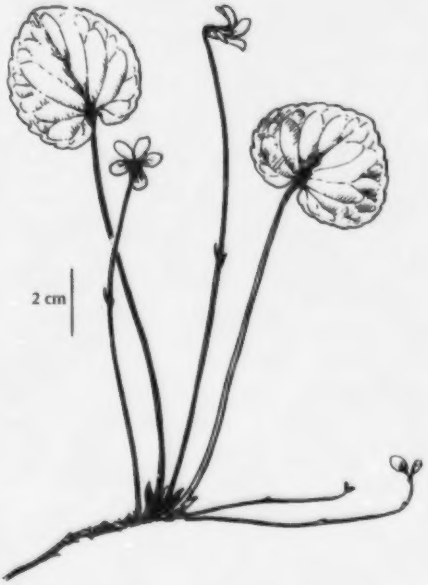
Flowers: Inflorescence of single, axillary flowers; petals 5, yellow, the lower petal 12-20 mm long including the 1- to 2-mm long spur, the lower 3 usually brown-penicilled and sometimes tinged with brown, the lateral pair bearded; sepals 5, lanceolate; style heads bearded.

Fruits: Capsules, smooth to hairy, 6-11 mm long; seeds dark brown.

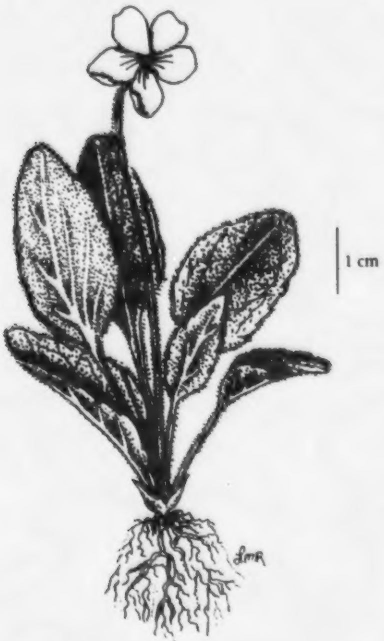
Notes: The ssp. *linguaefolia* (Nutt. *ex* T.& G.) Baker & Clausen *ex* Peck may occur in the Rocky Mountains of extreme SE BC. This subspecies can be distinguished from ssp. *praemorsa* by its longer, narrower stem leaves and the wedge-shaped leaf base.



Viola orbiculata



Viola palustris var. *palustris*



Viola praemorsa ssp. *praemorsa*

Viola purpurea **Kell. var. *venosa* (S. Wats.) Brainerd**

purple-marked yellow violet

HABITAT/RANGE:

Moist meadows and ridges in the alpine zone; rare in SW BC, known only from Manning Park and Silvertip Mtn.; S to CO, UT, NV and CA.

DESCRIPTION:

General: Perennial herb from a rhizome, not stoloniferous; stems erect, smooth, 5-15 cm tall.

Leaves: Basal leaves lanceolate, egg-shaped or wedge-shaped, often purplish, especially on the veins, coarsely few-toothed or -lobed, the blades 1-5 cm long, 0.5-3 cm wide, the stalks 2-12 cm long; stem leaves similar, reduced, round-toothed to deeply toothed; stipules lanceolate, entire to few-toothed.

Flowers: Inflorescence of single, axillary flowers; petals 5, yellow, the lower petal 5-12 mm long including the 1- to 1.5-mm long spur; the lower 3 usually purplish-brown pencilled, the lateral pair bearded; sepals 5, lanceolate; style heads bearded.

Fruits: Capsules, short-hairy, 5-12 mm long; seeds brown.

Viola renifolia **A. Gray** (*V. renifolia* var. *brainerdii* [Greene] Fern.)

kidney-leaved violet

HABITAT/RANGE:

Mesic to moist woodlands, open forests, streambanks, swamps and meadows in the montane and subalpine zones; infrequent throughout BC east of the Coast-Cascade Mountains, rare on C Vancouver Island; N to AK, YT and NT, E to NF and S to ME, NH, PA, MI, MN, SD, CO and ID.

DESCRIPTION:

General: Perennial herb from a short root stalk, without stolons, plants up to 15 cm tall; stems lacking.

Leaves: Basal leaves heart- to kidney-shaped, the blades 1.5-3.5 cm long, 2-6 cm wide, toothed, smooth or hairy, especially beneath, the stalks 3-15 cm long, hairy; stem leaves lacking; stipules lanceolate, 3-10 mm long, toothed.

Flowers: Inflorescence of single, axillary flowers; petals 5, white, the lower petal 10-15 mm long including the 1- to 1.5-mm long spur, the lower 3 purplish-pencilled, beardless; sepals 5, lanceolate; style heads smooth, slightly bilobed.

Fruits: Capsules, nearly globular, smooth, usually purple; seeds brown.

Viola selkirkii **Pursh *ex* Goldie**

Selkirk's violet; great spurred violet

HABITAT/RANGE:

Mesic to moist rock outcrops, thickets, swamps and open forests in the montane zone; infrequent in SC BC and WC BC; circumpolar, N to AK, YT and SW NT, E to NF and S to ME, NH, PA, OH, WI, MN, SD and WA, disjunct in NM; Eurasia.

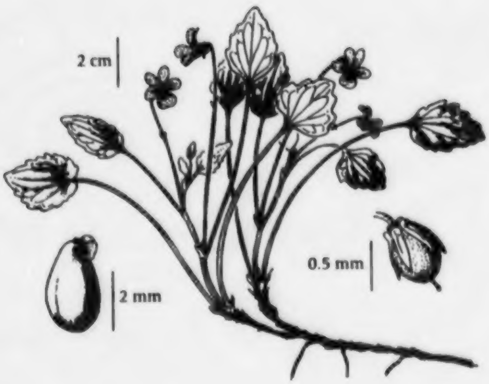
DESCRIPTION:

General: Perennial herb from a slender, elongate rootstock, without stolons, plants up to 5 cm tall; stems lacking.

Leaves: Basal leaves heart to egg-shaped, round-toothed, the blades 1.2-3 cm long, 1-3 cm wide, hairy above especially along the veins, the stalks 1.5-5 cm long; stem leaves lacking; stipules joined to the stalks, glandular-toothed, 6-15 mm long.

Flowers: Inflorescence of single, axillary flowers; petals 5, pale violet, the lower petal 8-13 mm long including the 3-5 mm long spur, all petals smooth; sepals 5, lanceolate; style heads smooth.

Fruits: Capsules, nearly round, seeds pale brown.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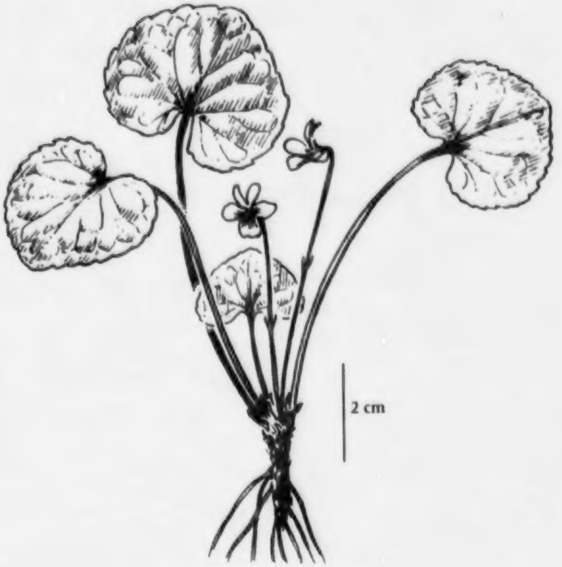
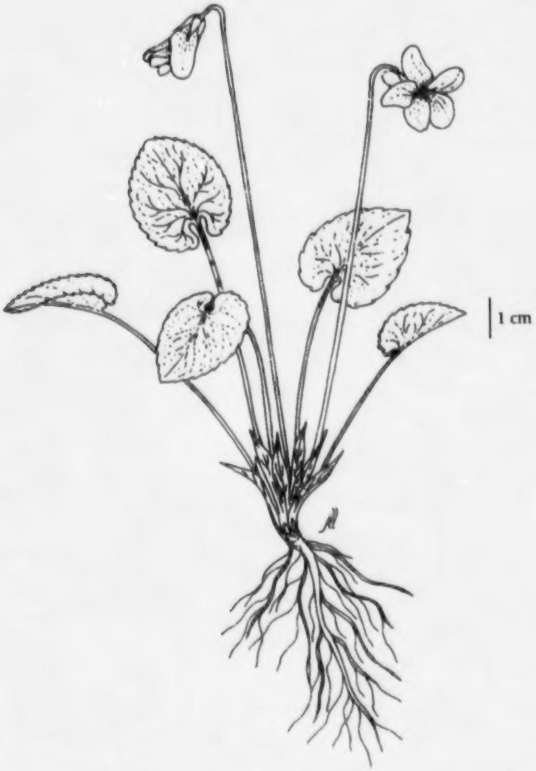
Viola purpurea var. *venosa*



Viola renifolia



Viola selkirkii

Viola sempervirens **Greene**

trailing yellow violet; evergreen violet

HABITAT/RANGE:

Moist woodlands and forests in the lowland and montane zones; frequent in SW BC, rare in SE BC (Kootenay Lake); N to SE AK and S to CA.

DESCRIPTION:

General: Perennial herb from a scaly rootstalk, with stolons; stems erect, finely hairy, 2-10 cm tall.

Leaves: Basal leaves evergreen, heart- to kidney-shaped, sometimes lanceolate, the blades 2-5 cm long, 1-3 cm wide, toothed, mottled with reddish-brown spots, the stalks 2-10 cm long; stem leaves few, similar, reduced; stipules brownish, membranous, lanceolate, entire or slender-toothed.

Flowers: Inflorescence of single, axillary flowers; petals 5, yellow, the lower petal 5-15 mm long including the 1- to 2-mm long, pouched spur, the lower 3 purplish-pencilled, the lateral pair yellow-bearded; sepals 5, lanceolate; style heads short-bearded.

Fruits: Capsules, smooth, purplish-mottled; seeds brown.

Viola septentrionalis **Greene**

northern violet; northern blue violet

HABITAT/RANGE:

Mesic to moist open forests in the montane zone; rare in S BC; disjunct in SK, ON, E to NF and S to ME, NH, PA, NC, TN, IO, NE, MT and WA.

DESCRIPTION:

General: Perennial herb from a scaly rootstalk, without stolons, plants up to 20 cm long; stems lacking.

Leaves: Basal leaves heart- to triangular-shaped, 2-7 cm long, 3-7 cm wide, coarsely toothed, stiff-hairy, the stalks 3-20 cm long; stem leaves lacking; stipules membranous, oblong-lanceolate, 5-10 mm long, glandular-fringed.

Flowers: Inflorescence of single, axillary flowers; petals 5, bluish-violet, the lower petal 12-20 mm long including the 1- to 2-mm long spur, the lower 3 white-based and long-hairy at the base; sepals 5, lanceolate, fringed; style heads smooth.

Fruits: Capsules, smooth, nearly round, purplish; seeds dark brown.

Viola tricolor **L. ssp.** ***tricolor***

Johnny-jump-up; European wild pansy

HABITAT/RANGE:

Mesic to dry roadsides and waste areas in the lowland and montane zones; infrequent in S BC; introduced from Europe.

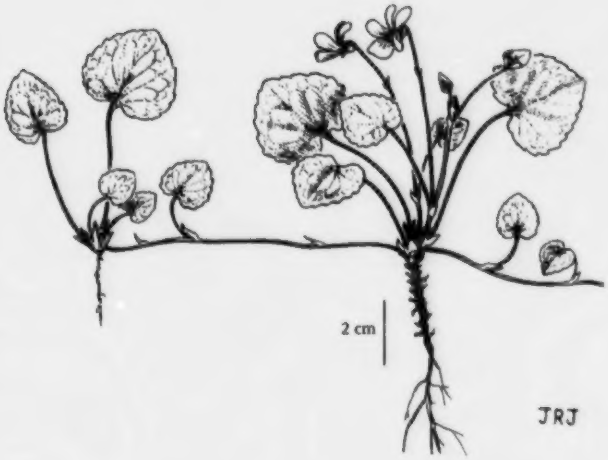
DESCRIPTION:

General: Annual herb from a fibrous root, without stolons; stems prostrate to ascending, angled, often branched from the base, 10-30 cm tall/long.

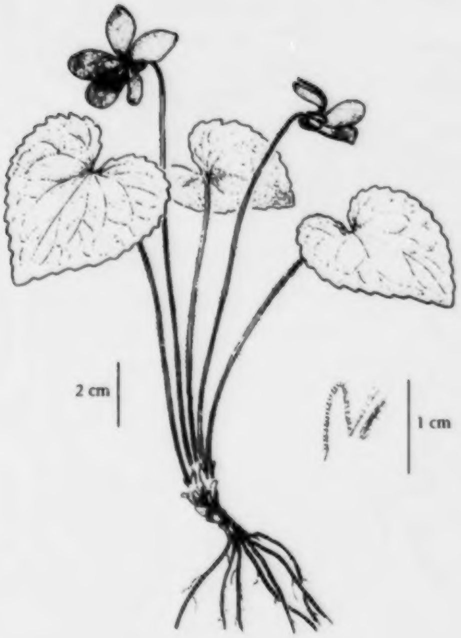
Leaves: Basal leaves few, soon deciduous; stem leaves rounded below, oblong to heart-shaped or elliptic upwards, toothed; stipules leaflike, 8-14 mm long, deeply lobed, the lobes 5-9, the terminal lobe largest.

Flowers: Inflorescence of single, axillary flowers; petals 5, blue-violet with yellow bases, sometimes yellow, the lower petal 10-16 mm long including the 1- to 2-mm long spur, the lower 3 black-pencilled at the base; sepals 5, broadly lanceolate, with earlike lobes at the base, fringed; style heads smooth.

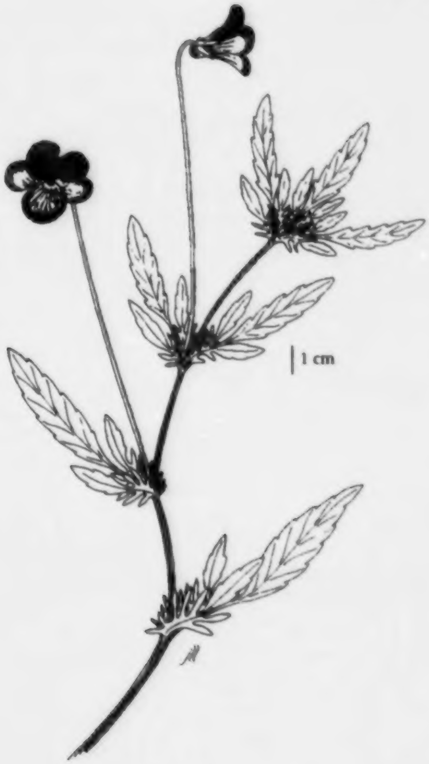
Fruits: Capsules, smooth, egg-shaped, 5-8 mm long; seeds light brown.



Viola sempervirens



Viola septentrionalis



Viola tricolor ssp. *tricolor*

***Viola vallicola* A. Nels. var. *major* (Hook.) Fabijan** (*V. nuttallii* Pursh var. *vallicola* [A. Nels.] St. John)
yellow sagebrush violet; yellow prairie violet

HABITAT/RANGE:

Dry grasslands, shrublands and open forests in the steppe and montane zones; frequent in SC BC north to 51° N; S to CO, UT, NV and CA.

DESCRIPTION:

General: Perennial herb from a short rootstalk, without stolons; stems erect, smooth, largely underground but the aerial stems 6-15 cm tall.

Leaves: Basal leaves egg-shaped to lanceolate, entire or slightly wavy, smooth to sparsely hairy, the blades 2-6 cm long, 1-2.5 cm wide, the stalks 3-10 cm long; stem leaves few, similar; stipules joined to the stem with the free end entire to toothed, smooth.

Flowers: Inflorescence of single, axillary flowers; petals 5, yellow, the lower petal 1.2-2 cm long including the 1- to 2-mm long spur, the lower 3 usually brown-penicilled and sometimes tinged with brown, the lateral pair bearded; sepals 5, lanceolate.

Fruits: Capsules, smooth; seeds light brown.

VISCACEAE

ARCEUTHOBIUM[9]

1. Flowers unstalked or the female ones with stalks up to 1 mm long, usually in pairs at each node; stems often over 2 mm thick and at least 3 cm long; plants parasitic on many genera of Pinaceae .... *A. campylopodium*

1. Flowers terminal on short lateral branches, the branches bearing the male flowers often more than 2 per node; stems scarcely as much as 2 mm thick and usually less than 3 cm long; plants parasitic on *Pinus* or *Pseudotsuga*.

    2. Secondary branches of twigs lying in the same plane, thus flat and fanlike; stems scarcely 1 mm thick; plants parasitic on *Pseudotsuga* .... *A. douglasii*

    2. Secondary branches of twigs distinctly whorled, not fanlike; stems over 1 mm thick; plants parasitic on *Pinus* .... *A. americanum*

***Arceuthobium americanum* Nutt. *ex.* Engelm.**
American dwarf mistletoe

HABITAT/RANGE:

Parasitic on *Pinus* in the lowland, steppe and montane zones; infrequent in S BC, rare W of Coast-Cascade Mountains; E to MB and S to CO, UT, NV and CA.

DESCRIPTION:

General: Perennial parasitic shrub; stems yellow-green, smooth, usually tufted, 2-18 cm long; segments usually 1-2 mm thick; accessory branches usually several per node, whorled, in more than 1 plane.

Flowers: Male flowers 2-3 mm wide, borne on short lateral stems, usually 2-several per node, the buds egg-shaped, the perianth lobes rounded on the backs; female flowers 2-several, whorled at each node, short-stalked.

Fruits: Berries, egg-shaped, about 3 mm long, greenish to bluish, usually 1-seeded, mucilaginous, maturing the 2nd summer.

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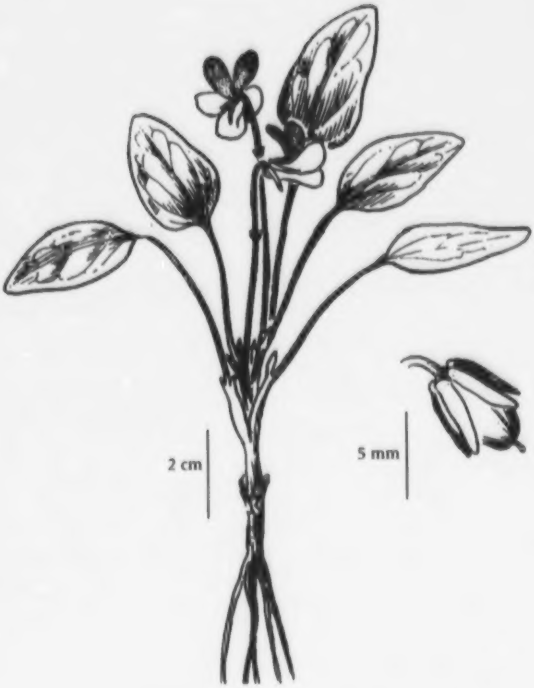
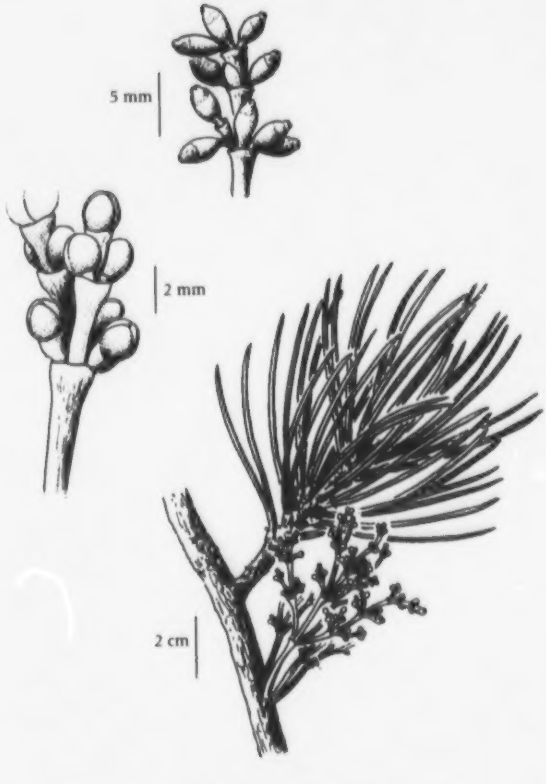
[9] Key adapted from Hitchcock and Cronquist (1973)



Viola vallicola var. *major*



Arceuthobium americanum

***Arceuthobium campylopodium* Engelm.** (*A. abietinum* Engelm. *ex* Munz, *A. laricis* [Piper] St. John, *A. tsugense* [Rosend.] G. Jones ssp. *mertensianae* [Hawksw.], Wiens & Nickrent and ssp. *tsugense*)
western dwarf mistletoe
HABITAT/RANGE:

Parasitic on Pinaceae in all but the alpine zone; common in BC north 56° N, rare on the Queen Charlotte Islands; E to PQ and NB and S to NM, AZ and CA.

DESCRIPTION:

General: Perennial parasitic shrub; stems yellow or brownish, smooth, 2-15 cm long; segments usually 1-2 (4) mm thick; accessory branches, if any, usually in 1 plane, the branches at each node fanlike.

Flowers: Male flowers 2.5-3 mm wide, yellow or orange to green, unstalked or nearly so, usually 2 per node, the buds lens-shaped, the perianth parts 3 or 4; female flowers 1 or 2 per node, unstalked or the stalks up to 1 mm long.

Fruits: Berries, egg-shaped, 3-5 mm long, greenish to bluish, usually 1-seeded, mucilaginous.

Notes: Some taxonomists have recognized the taxa occurring on *Tsuga*, *Abies* and *Larix* species at the specific level. Since there are no reliable morphological differences to distinguish them we prefer to merge them within *A. campylopodium*.

***Arceuthobium douglasii* Engelm.**
Douglas' dwarf mistletoe
HABITAT/RANGE:

Parasitic on *Pseudotsuga* in the montane zone; infrequent in SC and SE BC; S to TX, NM, AZ and CA.

DESCRIPTION:

General: Perennial parasitic shrub; stems bluish or bluish-green, smooth, 0.5-3 cm long; segments about 1 mm thick or less; accessory branches, if any, usually in 1 plane, the branches at each node fanlike.

Flowers: Male flowers about 2 mm wide, greenish to yellow, terminal on short, stalk-like joints, usually 2 per node, the buds egg-shaped, the perianth lobes rounded on the backs; female flowers 2 per node, short-stalked.

Fruits: Berries, egg-shaped, about 3 mm long, greenish to bluish, usually 1-seeded, mucilaginous, maturing the 2nd summer.

ZYGOPHYLLACEAE

TRIBULUS

***Tribulus terrestris* L.**
puncture vine
HABITAT/RANGE:

Dry fields and waste places in the steppe zone; rare in SC BC; introduced from Eurasia.

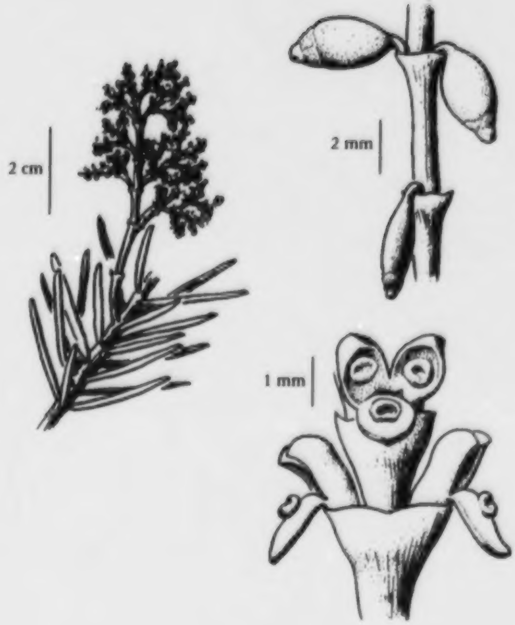
DESCRIPTION:

General: Annual herb from a taproot; stems prostrate, hairy, mat-forming, the mats up to 100 cm wide, freely branching.

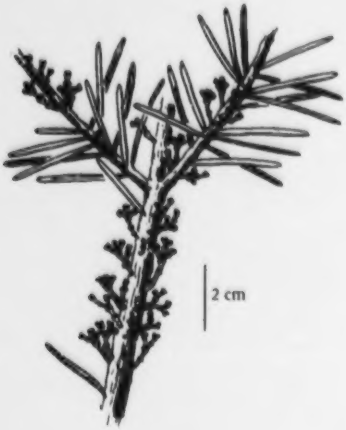
Leaves: Stem leaves opposite, pinnately lobed with 4-8 pairs of leaflets, the leaflets egg-shaped, 5-15 mm long; stipules 1-2 mm long.

Flowers: Inflorescence of short-stalked, single, axillary flowers; petals 5, yellow, 3-5 mm long; sepals 5.

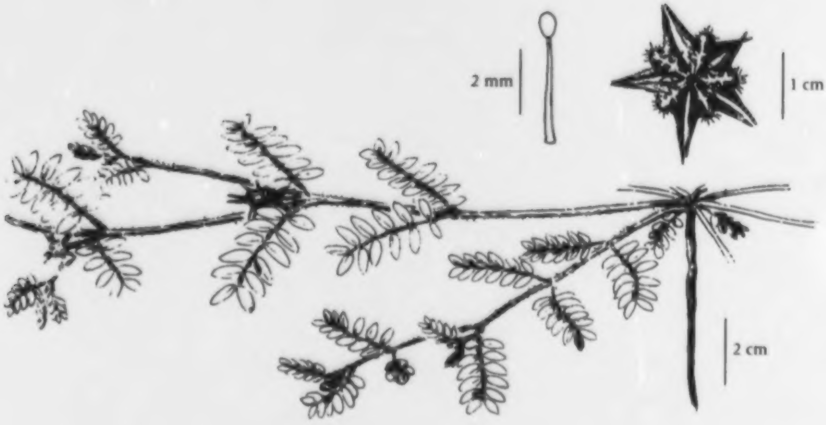
Fruits: Schizocarps, of 5 nutlike segments, the segments horny, 2-spined, the spines 2-6 mm long; fruit segments 2-4 seeded.



Arceuthobium campylopodium



Arceuthobium douglasii



Tribulus terrestris

PTERIDOPHYTES[10]

KEY TO PTERIDOPHYTE FAMILIES

1. Leaves simple, often inconspicuous and sometimes fused with a single, unbranched midvein.
    2. Leaves whorled, sheathing the stem; stems jointed, hollow (except in *Equisetum scirpoides*) (EQUISETOPSIDA) .... EQUISETACEAE (pg. 262)
    2. Leaves spirally arranged or opposite; stems not jointed, solid (LYCOPODIOPSIDA).
        3. Plants homosporous, the spores similar and numerous in each sporangium; leaves without a ligule .... LYCOPODIACEAE (pg. 274)
        3. Plants heterosporous, the microspores numerous and small, the megaspores fewer (up to 300 in Isoetes) and larger; leaves ligulate.
            4. Leaves elongate, slender, usually over 10 cm long; stems unbranched; megaspores usually 50-300 .... ISOETACEAE (pg. 270)
            4. Leaves short to elongate, less than 0.5 cm long; stems branched; megaspores 1-4 .... SELAGINACEAE (pg. 282)
1. Leaves usually divided into leaflets (pinnae), conspicuous, with numerous branched veins .... PTERIDOPSIDA
    5. Plants heterosporous, aquatic or semiaquatic; sporangia borne in specialized groups.
        6. Plants usually free-floating; microsporangia and megasporangia borne in separate sporocarps; leaves less than 1 cm long .... AZOLLACEAE (pg. 300)
        6. Plants rooted; microsporangia and megasporangia borne on the same sporocarp; leaves 2-15 cm long .... MARSILEACEAE (pg. 326)
    5. Plants homosporous, terrestrial or epiphytic; sporangia borne on the leaves, not enclosed in sporocarps.
        7. Sporangia large, borne in terminal appendages that arise from a common stalk .... OPHIOGLOSSACEAE (pg. 288)
        7. Sporagia small, borne on the back or margins of the leaves or on modified fronds.
            8. Fronds very delicate (resembling a leafy liverwort), the blades only one cell thick; plants rhizomatous with threadlike rhizomes, much branched and spreading .... HYMENOPHYLLACEAE (pg. 326)
            8. Fronds much coarser, the blades two to several cells thick; plants tufted or with rhizomes which are stouter and not threadlike.
                9. Sori on or near the margin of the lower surface of the frond, covered by inrolled indusium-like margin, or apparent margin.
                    10. Rhizomes coarse, much elongated, with hairs only, lacking scales; fronds scattered, very large and coarse, usually over 30 cm long .... DENNSTAEDTIACEAE (pg. 304)
                    10. Rhizomes very short, scaly, but often with hairs as well; fronds mostly clustered, much smaller, sometimes quite delicate, less than 30 cm long .... PTERIDACEAE (pg. 330)
                9. Sori on the lower surface of the fronds, not covered by the leaf margins.
                    11. Leaves of two distinct forms, fertile and sterile fronds dissimilar.
                        12. Sori continuous along both sides of the midrib; sterile leaves pinnate, pinnae with entire margin .... BLECHNACEAE (pg. 302)

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[10] Contributed by Adolf Ceska.

12. Sori not continuous; sterile leaves pinnate with pinnae toothed or deeply cut .... DRYOPTERIDACEAE (pg. 306)

11. Leaves not of two distinct forms, fertile and sterile fronds alike.

    13. Indusia present, at least on young fertile fronds, sometimes only as filamentous segments.

        14. Rhizomes slender, long-creeping; veins reaching the margins of the pinnae ... . THELYPTERIDACEAE (pg. 340)

        14. Rhizomes thick, short-creeping; veins not reaching the margins of the pinnae.

            15. Indusia attached in the centre, margins of indusia free .... DRYOPTERIDACEAE (pg. 306)

            15. Indusia attached along their margins, pouch-like, oval or linear.

                16. Sori fused in a chain-like fashion along the midrib of the pinnules .... BLECHNACEAE (pg. 302)

                16. Sori single, rounded or oblique, not fused in a chain-like fashion.

                    17. Fronds once pinnate with rounded pinnae .... ASPLENIACEAE (pg. 298)

                    17. Fronds pinnate with pinnae either incised or once or twice divided again into smaller pinnules .... DRYOPTERIDACEAE (pg. 306)

    13. Indusia absent.

        18. Sori elongated along the veins, usually confluent; backs of fronds covered with white or yellowish powder .... PTERIDACEAE (pg. 330)

        18. Sori rounded, usually not confluent; backs of fronds not covered with powder.

            19. Fronds pinnately lobed, the lobes not reaching the rachis .... POLYPODIACEAE (pg. 328)

            19. Fronds with pinnae pinnately lobed or divided again into smaller pinnules; lobes reaching the rachis.

                20. Leaves tufted on short rhizomes that are covered by the conspicuous, persistent, densely clustered stipe bases of previous years .... DRYOPTERIDACEAE (pg. 306)

                20. Leaves scattered or in small tufts, not accompanied by conspicuous, persistent stipe bases of previous years.

                    21. Leaves fringed-margined and with unicellular hairs along the rachis and the midribs of the pinnae, the margins fringed with hairs .... THELYPTERIDACEAE (pg. 340)

                    21. Leaves smooth or merely glandular, the margins not fringed with hairs .... DRYOPTERIDACEAE (pg. 306)

EQUISETOPHYTA

EQUISETOPSIDA

EQUISETACEAE

EQUISETUM

1. Shoots with cones at the top of the stems, rarely also at the ends of the branches.
    2. Fertile and sterile shoots not alike; fertile shoots whitish, pinkish or brown, unbranched or sparsely branched; fertile shoots appear earlier than branched sterile shoots, cones appearing in the spring.
        3. Cone-bearing stems usually not branched, fleshy, whitish, pinkish or brown.
            4. Stems 5-20 mm in diameter; stem sheaths with 20-40 teeth; cones hollow, 4-8 cm long .... *E. telmateia*
            4. Stems 3-5 mm in diameter; stem sheaths with less than 20 teeth; cones solid inside, less than 4 cm long .... *E. arvense*
        3. Cone-bearing stems branched and green, persistent, although cones and tips of stems soon wither.
            5. Stem sheaths with teeth fused into 3-6 broad lobes, the number of lobes less than number of ribs on stem; branches usually branched again .... *E. sylvaticum*
            5. Stem sheaths with distinct teeth, the number of teeth equal to number of ribs on stem; branches not branched again.
                6. Stem sheaths with teeth which have broad whitish membranaceous margins; branches fine, solid, rectangular in cross section; branch sheaths with 4 teeth .... *E. pratense*
                6. Stem sheaths with brownish-green teeth lacking whitish membranaceous margins; branches coarse, hollow, triangular in cross section; branch sheaths with 3 teeth .... *E. arvense*
    2. Fertile and sterile shoots similar; fertile green, branched or unbranched, appearing at about the same time as the sterile shoots or later, cones appearing in summer.
        7. Cones rounded at the top.
            8. Stems with deep furrows, their central cavity less than 1/4 of the stem diameter; the stem sheaths with 5-10 teeth; teeth black with conspicuous white margins .... *E. palustre*
            8. Stems without deep furrows, their central cavity more than 1/2 of stem diameter, the stem sheaths with 15-30 teeth; teeth with obscure, narrow white margins or early deciduous.
                9. Stems firm, light green, their central cavity at most 2/3 of the stem diameter; sheaths dull, the teeth of the stem sheaths deciduous leaving a wavy margin at the sheath tips .... *E. laevigatum*
                9. Stems softer, dark green, their central cavity at least 4/5 of the diameter; sheaths shiny, the tips of the sheaths with small blackish, narrowly white-margined teeth .... *E. fluviatile*
        7. Cones with abruptly sharp-pointed tips.
            10. Shoots robust; stems 40-150 cm tall and about 6 mm thick, with 15-25 flat ribs, their central cavity about 2/3 of the stem diameter .... *E. hyemale*

10. Shoots smaller; stems less than 50 cm tall and less than 4 mm thick, with less than 14 ribs, solid or their central cavity up to 1/3 of the stem diameter.

11. Stems straight or slightly curved, usually more than 15 cm long and more than 0.6 mm in diameter, hollow, their central cavity about 1/3 of the stem diameter .... *E. variegatum*

11. Stems curved, contorted, usually less than 15 cm long and less than 0.6 mm in diameter; stems solid, without a central cavity .... *E. scirpoides*

1. Shoots sterile, without cones.

12. Shoots branched with branches in whorls.

13. Teeth of the stem sheaths fused in 3-6 lobes; most branches branched again in a tree-like fashion .... *E. sylvaticum*

13. Teeth of the stem sheaths distinct; branches not branched again or with occasional branches.

14. Stem without ribs, their central cavity about 4/5 of the stem diameter; branches in one or very few, often incomplete, whorls .... *E. fluviatile*

14. Stems with ribs, their central cavity not more than 2/3 of the stem diameter; branches in numerous regular whorls.

15. Stems thick, robust, 5-20 mm in diameter, pale green; ribs 20-40, inconspicuous; sheaths with 20-40 teeth .... *E. telmateia*

15. Stems slender, less than 5 mm in diameter, green; ribs prominent, 4-18; sheaths with less than 20 teeth.

16. Branches delicate; teeth about 1/2 of the total length of the sheaths; stems with a central cavity more than 1/2 of the stem diameter .... *E. pratense*

16. Branches coarse; teeth 1/4-1/3 of the total length of sheaths; stems with a central cavity less than 1/2 of the stem diameter.

17. Lowest branch internode longer than the stem sheaths; teeth of the branch sheaths 2-4 times longer than wide, gradually concavely tapered to a sharp point; stems with a central cavity about 1/5 of the stem diameter, side cavities narrower .... *E. arvense*

17. Lowest branch internode shorter than the stem sheaths; teeth of the branch sheaths as wide as long, triangular sharp-pointed; stems with a central cavity about 1/3 of the stem diameter, side cavities almost as wide as the central cavity .... *E. palustre*

12. Shoots not branched, or with irregular branches (sometimes the result of an injury to the terminal part of the stem).

18. Stems with a large central cavity about 4/5 of the stem diameter .... *E. fluviatile*

18. Stems with a central cavity less than 2/3 of the stem diameter, or solid.

19. Sheaths entirely green with deciduous teeth; stems annual with smooth ridges .... *E. laevigatum*

19. Sheaths with a black band or entirely black or brown, teeth persistent or tardily deciduous; stems perennial or evergreen with minutely toothed or warty ridges.

20. Stems robust, more than 2.5 mm in diameter and usually over 50 cm tall; teeth tardily deciduous .... *E. hyemale*

20. Stems finer, less than 2.5 mm in diameter and shorter than 50 cm; teeth persistent.

21. Sheaths with 3-14 teeth; stem ridges the same number as teeth; stems straight or slightly curved, hollow, with central cavity about 1/3 of the stem diameter .... *E. variegatum*

21. Sheaths with 3 teeth; stem ridges 6; stems curved, contorted, solid, without a central cavity .... *E. scirpoides*

Equisetum arvense **L.** (*E. arvense* L. var. *boreale* [Bong.] Rupr.)

common horsetail; field horsetail

HABITAT/RANGE:

Wet to mesic sandy or disturbed sites, streambanks, open places and shady forests from the lowland and steppe to alpine zones; common throughout BC; circumpolar, N to AK, YT and NT, E to NF and S to SC, GA, AL, MS, TX, NM, AZ, CA and MX; Greenland, Eurasia, N. Africa, New Zealand.

DESCRIPTION:

General: Perennial from a felty-hairy, tuber-bearing rhizome.

Stems: 10-80 cm tall, 3-5 mm thick, with their central cavity less than 1/2 the stem diameter, regularly branched, the sheaths with 10-16 pointed teeth; branches in regular whorls, triangular in cross-section; the 1st internode of branches longer than the corresponding stem sheaths; fertile stems appearing in spring before sterile stems, about 10-15 cm tall, pale brown, unbranched, dying after the spores are shed, the sheaths 4-6, pale brown with 6-12 darker teeth.

Cones: 1-4 cm long, with solid centres, rounded on the tops.

Equisetum fluviatile **L.** (*E. limosum* L.)

swamp horsetail

HABITAT/RANGE:

Shallow water at lake margins, marshes, bogs and wet ditches in the lowland, steppe and montane zones; frequent throughout BC; circumpolar, N to AK, YT and NT, E to NF and S to VA, IN, IA, NE, WY, ID and OR; Eurasia.

DESCRIPTION:

General: Perennial from a smooth, shiny, often reddish rhizome.

Stems: 30-150 cm tall, 2-10 mm thick, their central cavity more than 4/5 the stem diameter, simple or with a few whorled branches, the sheaths with 12-30 narrow, dark pointed teeth.

Cones: 1-2 cm long, rounded on the top.

Notes: A hybrid with *E. arvense* (*E.* x *litorale* Kuehl *ex* Rupr.) is frequent in places where both species occur.

Equisetum hyemale **L. ssp. *affine* (Engelm.) Calder & Taylor** (*Hippochaete hyemalis* [L.] Brubin, *E. hyemale* var. *affine* [Engelm.] A.A. Eaton, var. *californicum* Milde, var. *elatum* [Engelm.] Morton)

scouring-rush

HABITAT/RANGE:

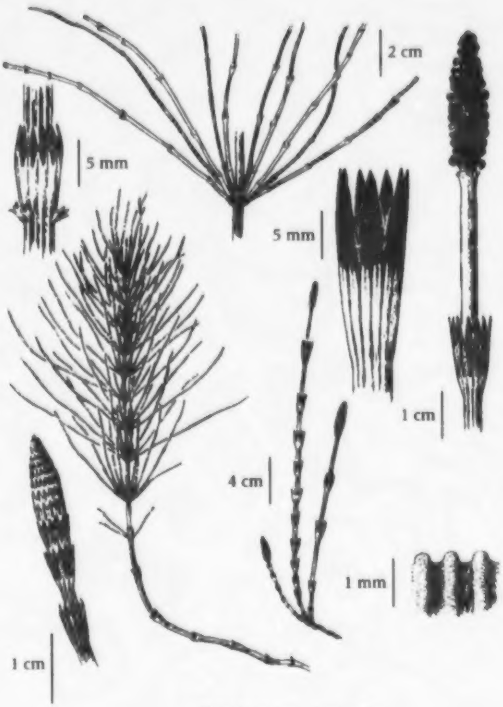
Moist alluvial forests, riverbanks, roadsides, clearings and forest margins in the lowland, steppe and montane zones; frequent throughout BC; N to AK, YT and NT, E to NF and S to SC, GA, AL, MS, TX, NM, AZ, and CA.

DESCRIPTION:

General: Perennial evergreen herbs from a thick, blackish rhizome.

Stems: 30-120 cm tall, 4-6 mm thick, dark green, their cental cavity more than 2/3 the stem diameter, not branched, the sheaths with 14-50 teeth that fall off leaving only darker traces.

Cones: 8-15 mm long, the tip tapered to a black-tinged point.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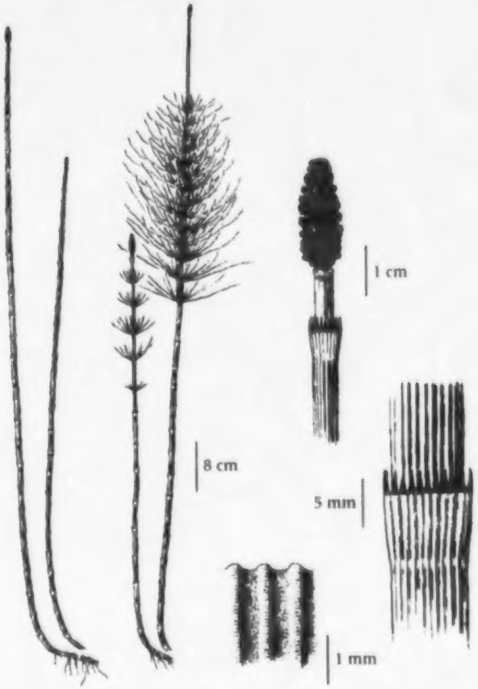
Equisetum arvense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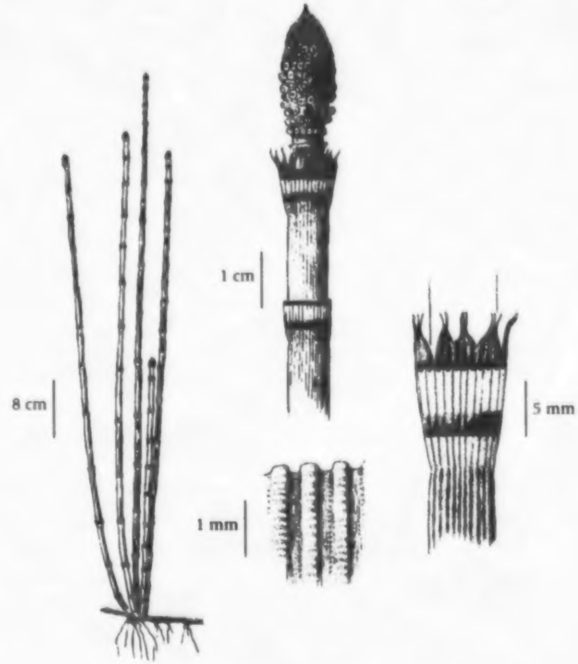
Equisetum fluviatile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Equisetum hyemale ssp. *affine*

Equisetum laevigatum **A. Br.**

smooth scouring-rush

HABITAT/RANGE:

Dry to moist sandy soil, wet margins of lakes, streambanks, roadsides in the steppe and montane zones; frequent in SC and SE BC; E to ON and S to OH, IL, OK, TX, NM, AZ and CA; Mexico.

DESCRIPTION:

General: Perennial from a rhizome.

Stems: 20-120 cm tall, 3-8 mm thick, light green, their central cavity 2/3-3/4 the stem diameter, unbranched, the sheaths with 12-30 teeth that fall off leaving only small depressions at the sheath tips.

Cones: 8-15 mm long, with a blunt or rounded tip.

Notes: A hybrid with *E. hyemale* (*E.* x *ferrissii* Clute) occurs infrequently in SC BC.

Equisetum palustre **L.**

marsh horsetail

HABITAT/RANGE:

Marshes, swamps, stream banks and wet forests from the lowland and steppe to montane zones; infrequent in BC; circumpolar, N to AK, YT and NT, E to NF and S to VE, CT, MI, IL, MN, ND, MT, ID and CA; Eurasia.

DESCRIPTION:

General: Perennial from a smooth rhizome.

Stems: 10-60 cm tall, 1-3 mm thick, their central cavitiy less than 1/2 the stem diameter, unbranched or branched with irregular whorls; the sheaths with 5-10 dark teeth with whitish papery margins; branches (when present) in irregular whorls, with 4-6 blunt ridges, their first internodes shorter than the corresponding sheaths.

Cones: 1-3 cm long, rounded at the tip.

Notes: A hybrid with *E. telmateia* (*E.* x *font-queri* Rothm.) occurs rarely in BC (Cody & Britton 1989).

Equisetum pratense **Ehrh.**

meadow horsetail

HABITAT/RANGE:

Mesic to wet forests, riverbanks, meadows, bog margins, from the montane to subalpine zones; frequent in BC east of the Coast-Cascade Mountains, infrequent in SC BC; N to AK, YT and NT, E to MI and S to NJ, MI, IA, SD, MT and WA; Eurasia.

DESCRIPTION:

General: Perennial from a smooth, blackish rhizome.

Stems: 10-60 cm tall, 1-2 mm thick, their central cavity 1/2 the stem diameter, regularly and abundantly branched, the sheaths with 10-20 narrow teeth, the teeth dark with white margins; branches in regular whorls, triangular in cross-section, the 1st internodes of each branch shorter than the corresponding sheaths.

Cones: 1-4 cm long, rounded at the tip.

Equisetum scirpoides **Michx.**

dwarf scouring-rush

HABITAT/RANGE:

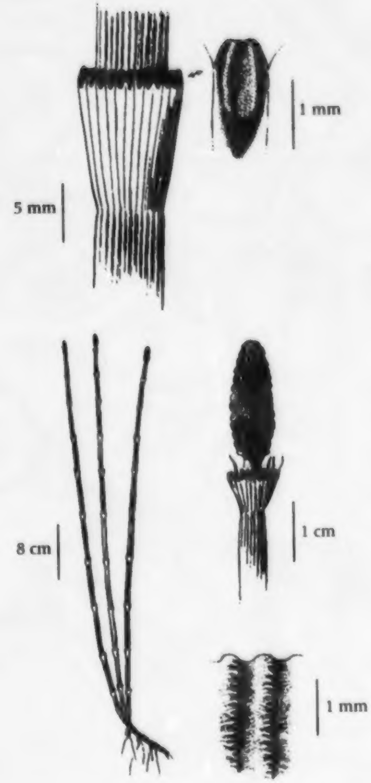
Dry to wet coniferous forests, peat bogs, fens, swamps, and alpine tundra, from the montane to alpine zones; frequent in BC in and east of the Coast-Cascade Mountains; circumpolar, N to AK, YT and NT, E to NF and S to CT, NY, MI, WI, IL, SD, ID and WA; Eurasia.

DESCRIPTION:

General: Perennial evergreen herb from a short, slender, brownish rhizome.

Stems: 3-20 cm tall, 1-1.5 mm thick, kinked, without a central cavity, not branched, the sheaths with 3 teeth, the teeth dark with white margins.

Cones: 0.5-1 cm long, with a pointed tip at the top.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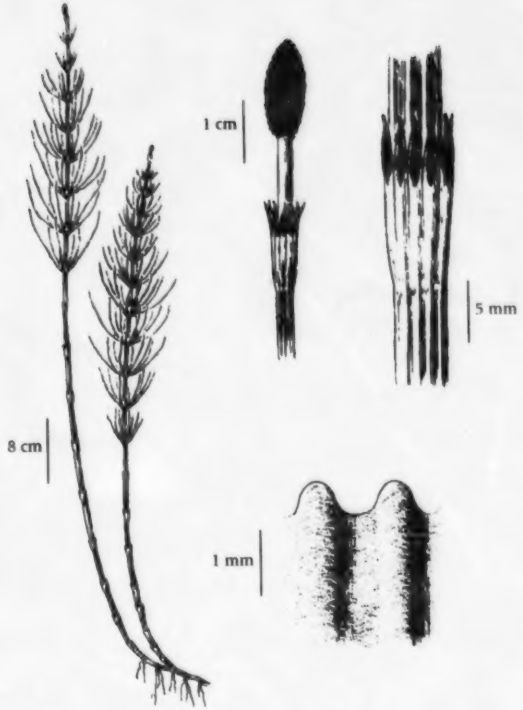
Equisetum laevigatum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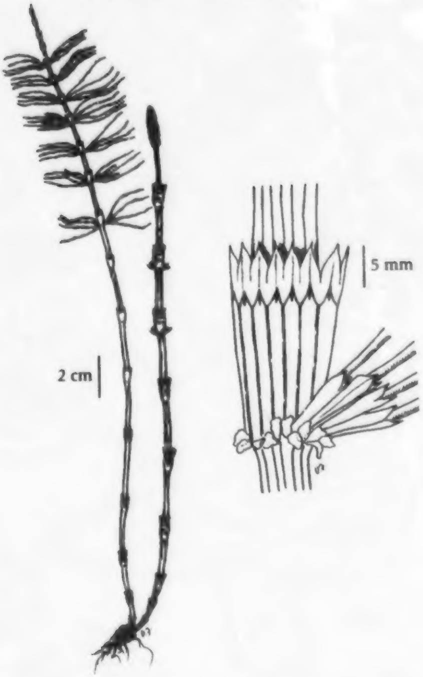
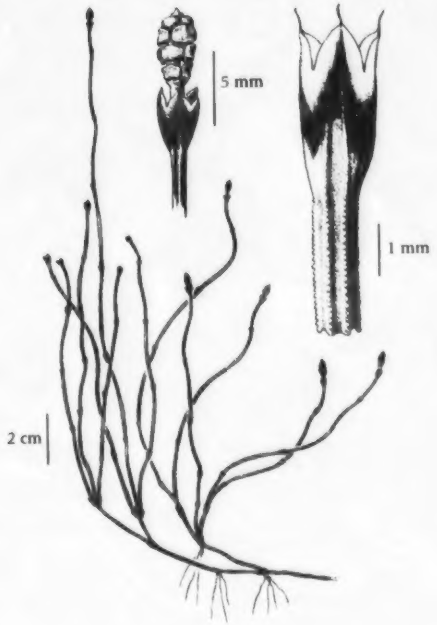
Equisetum palustre



Equisetum pratense



Equisetum scirpoides

Equisetum sylvaticum **L.**

wood horsetail

HABITAT/RANGE:

Moist to wet forests, meadows, clearings, swamps and bog margins in the montane zone; frequent in BC east of the Coast-Cascade Mountains; circumpolar, N to AK, YT and NT, E to NF and S to MA, PA, WV, OH, MI, WI, SD, WY, MT and WA; Eurasia.

DESCRIPTION:

General: Perennial from a smooth rhizome.

Stems: 10-60 cm tall, 1-4 mm thick, their central cavity 1/2 the stem diameter, regularly and richly branched, the sheaths with 8-18 teeth which remain fused and form 3-4 groups; branches with 3-4 ridges, branched again, the 1st internodes of the main branches longer than the corresponding sheaths.

Cone: 1-3 mm long, rounded at the tip.

Equisetum telmateia **Ehrh. ssp.** ***braunii*** **(Milde) Hauke** (*E. maximum* Lam.)

giant horsetail

HABITAT/RANGE:

Moist to wet alluvial forests, loamy banks, cliffs, seepage areas, gullies, swamps, and roadsides, in the lowland and montane zones; frequent in coastal BC, rare east of the Coast-Cascade Mountains; S to CA.

DESCRIPTION:

General: Perennial from a felty-hairy, blackish, tuber-bearing rhizome.

Stems: Sterile stems 15-150 cm tall, 5-20 mm thick, their central cavity more than 2/3 the stem diameter, regularly and abundantly branched, the sheaths with 15-30 teeth, the teeth with dark tips; branches in regular whorls; fertile stems appearing in spring before sterile stems, 10-40 cm tall, pale brown, unbranched, dying when the spores are shed, the sheaths 4-8, pale brown with 20-40 darker teeth.

Cones: 4-8 cm long, hollow, rounded at the tip.

Equisetum variegatum **Schleicher**

northern scouring-rush

HABITAT/RANGE:

Wet lake shores, streambanks, fens, meadows, clearings and roadsides from the lowland and steppe to subalpine and (rarely) alpine zones; frequent in coastal (ssp. *alaskanum*) and interior BC (ssp. *variegatum*); circumpolar, N to AK, E to NF and S to NH, CT, PA, MI, MN, WY, CO, UT, ID and OR; Eurasia.

DESCRIPTION:

General: Perennial evergreen from a branched, shiny, blackish rhizome.

Stems: 10-50 cm tall, 1-3 mm thick, their central cavity 1/4 the stem diameter, unbranched, the sheaths with 3-14 teeth.

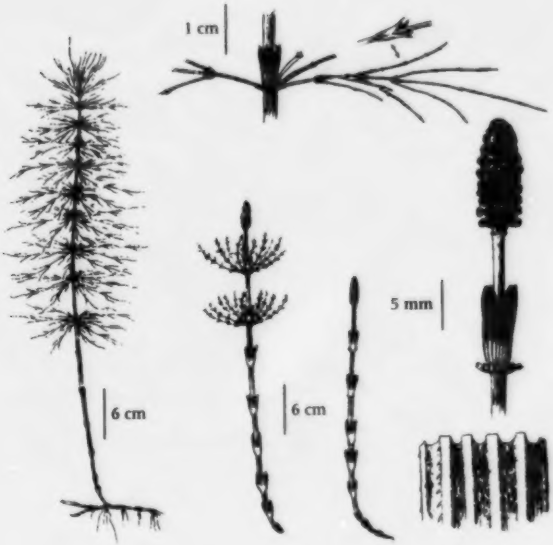
Cones: 5-7 mm long, pointed at the tip.

Notes: Two subspecies can be distinguished in BC:

1. Sheath teeth brown with wide white margins .... *ssp. variegatum*

1. Sheath teeth completely black or at most narrowly white-margined...... ssp. *alaskanum* (A. A. Eaton) Hult.

Notes: A hybrid with *E. hyemale* (*E.* x *trachyodon* A. Braun) was collected on the Queen Charlotte Islands (Calder & Taylor 1968). A hybrid with *E. laevigatum* (*E.* x *nelsonii* [A. A. Eaton] Schaffn.) has not been reported from BC, but can be expected.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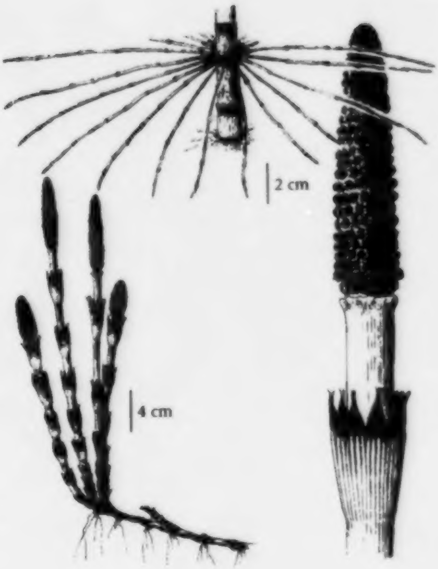
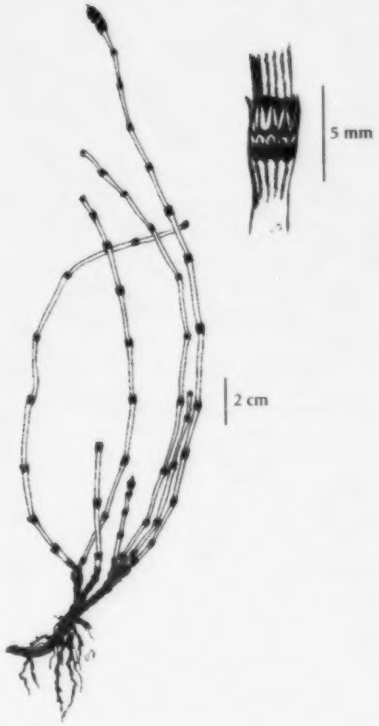
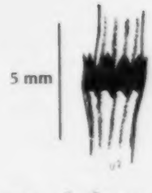
Equisetum sylvaticum



Equisetum telmateia ssp. *braunii*





ssp. *alaskanum*

Equisetum variegatum ssp. *variegatum*

LYCOPODIOPHYTA

ISOETOPSIDA

ISOETACEAE

ISOETES

1. Plants terrestrial, growing in seasonally wet depressions or lake margins.
    2. Sporangia on the inner side of sporophylls covered with "velum" (a membranous flap of tissue covering the sporangium) .... *I. nuttallii*
    2. Sporangia on the inner side of sporophylls naked or velum covering only lower 1/2 of the sporangium .... *I. howellii*
1. Plants aquatic, growing in shallow water of lakes, occasionally exposed in summer on drying lake shores.
    3. Megaspores smooth or with low, blunt ridges.
        4. Base of the leaves green; megaspores smooth; microspores warty .... *I. occidentalis*
        4. Base of the leaves blackish; megaspores with low ridges; microspores spiny .... *I. howellii*
    3. Megaspores with spines or spines confluent into short sharp ridges.
        5. Plants flaccid; leaves pliant; megaspores with long thin spines, spines about the same length all over the spore; microspores smooth .... *I. echinospora*
        5. Plants rigid; leaves stiff; megaspores with spines of unequal length or with short sharp ridges; microspores spiny or with warts.
            6. Megaspores with short thin spines, spines shorter and denser around the girdle; microspores spiny .... *I. maritima*
            6. Megaspores with rough spines or sharp confluent ridges, without shorter spines around the girdle; microspores smooth or warty .... *I. occidentalis*

Isoetes echinospora **Dur.** (*I. muricata* Dur., *I. braunii* Dur., *I. tenella* Leman *ex* Desv.)
bristle-like quillwort

HABITAT/RANGE:

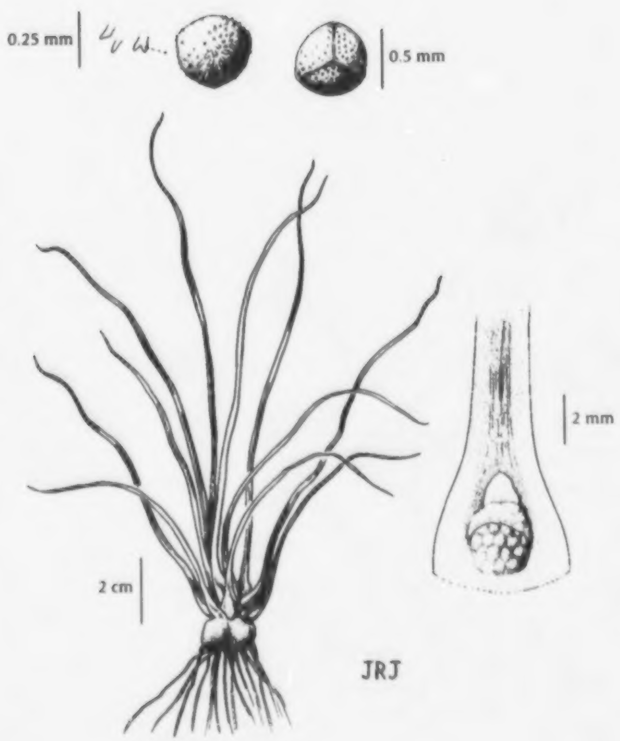
Lakes in the lowland to subalpine zones; infrequent throughout BC; circumpolar, N to AK, YT and NT, E to NF and S to NJ, MI, WI, MT, UT and CA; Eurasia.

DESCRIPTION:

General: Perennial aquatic plants from a short 2-lobed rootstock.

Leaves: Deciduous, flaccid, 5-25 cm long.

Sporangia: With velum covering only its lower half; megaspores 0.4-0.55 mm in diameter, with thin long spines that are of about equal length all over the spore; microspores 20-30 mm, smooth or with scattered hairs.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2 cm
JRJ

Isoetes echinospora

Isoetes howellii **Engelm.** (*I. minima* A.A. Eaton)

Howell's quillwort

HABITAT/RANGE:

Lake margins exposed in summer, in the steppe and montane zones; rare in SC and SE BC; S to MT and CA, disjunct in N UT.

DESCRIPTION:

General: Perennial semiterrestrial or terrestrial plants from a short 2-lobed rootstock.

Leaves: Deciduous, flaccid, 5-25 cm long, with long transparent lower parts and black-tinged bases.

Sporangia: With velum covering only its lower half; megaspores 0.3-0.45 mm in diameter, smooth or with long, low wavy ridges; microspores 20-30 mm, spiny.

Isoetes maritima **Underw.** (*I. beringensis* Komarov, *I. macounii* A.A. Eaton, *I. muricata* Dur. ssp. *maritima* [Underw.] Hult.)

coastal quillwort

HABITAT/RANGE:

Lake margins and shallow water in the lowland and montane zones; frequent in coastal BC, rare in SC BC; amphiberingian, N to AK and S to WA; E Asia (Bering Island).

DESCRIPTION:

General: Perennial aquatic or semiterrestrial plants from a short, 2-lobed rootstock.

Leaves: Deciduous in winter, pliant or stiff, 5-20 cm long.

Sporangia: With velum covering only its lower half; megaspores 0.4-0.55 mm in diameter, with thin spines, spines longer at the lower part of the spore and short, dense around the girdle; microspores 30-40 mm, spiny.

Isoetes nuttallii **A. Br.**

Nuttall's quillwort

HABITAT/RANGE:

Vernal pools and ephemeral winter seepages in the lowland zone; infrequent on SE Vancouver Island and Gulf Islands; S to CA.

DESCRIPTION:

General: Perennial terrestrial deciduous plants from a short 2-lobed or 3-lobed rootstock.

Leaves: Deciduous, flaccid, 5-25 cm long.

Sporangia: Entirely covered by velum; megaspores 0.3-0.6 mm in diameter, smooth or with low, wavy blunt ridges; microspores 20-30 mm, spiny.

Isoetes occidentalis **Henderson** (*I. fettii* [A.A. Eaton] Pfeiffer, *I. lacustris auct. non* L., *I. lacustris* var. *paupercula* Engelm., *I. paupercula* [Engelm.] A.A. Eaton, *I. piperi* A.A. Eaton)

western quillwort

HABITAT/RANGE:

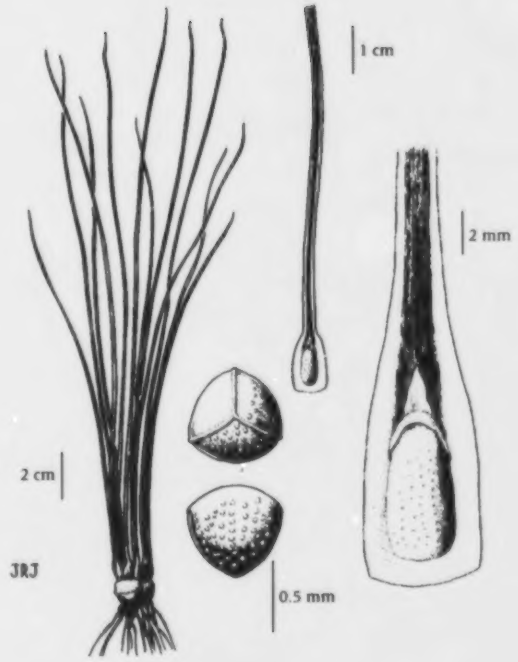
Lakes in the lowland, steppe and montane zones; frequent in S BC; S to CO, UT and CA.

DESCRIPTION:

General: Perennial aquatic plants from a short, 2-lobed rootstock.

Leaves: Deciduous, stiff, 3-25 cm long.

Sporangia: With velum covering only its lower half; megaspores 0.5-0.7 mm in diameter, smooth or with low blunt ridges; microspores 35-45 mm, smooth or with small warts.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JRJ
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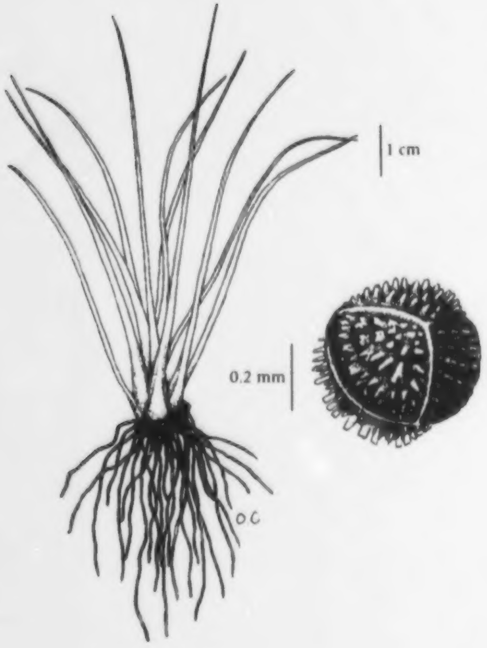
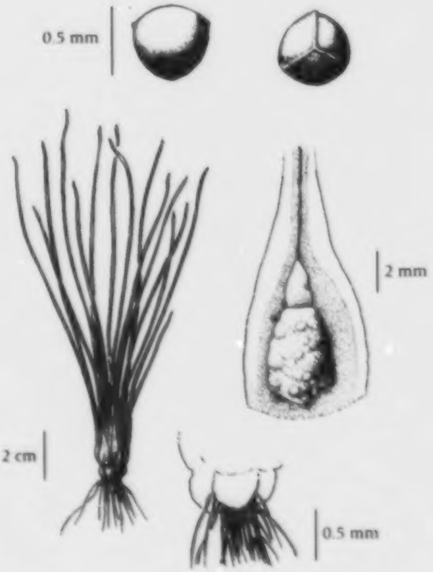
Isoetes howellii



Isoetes maritima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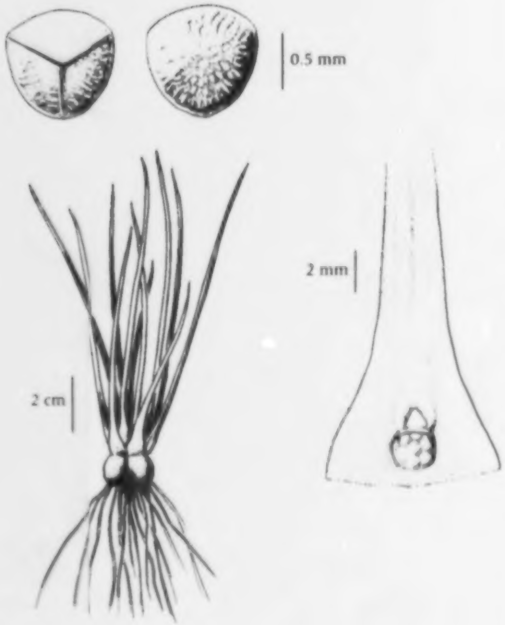
Isoetes nuttallii


0.5 mm
2 mm
2 cm

Isoetes occidentalis

LYCOPODIOPSIDA

LYCOPODIACEAE

1. Sporangia in the axils of ordinary green leaves, not segregated into definite cones .... *Huperzia*

1. Sporangia segregated into definite cones.

    2. Plants short creeping with a single upright branch; sporophylls (bracts of the spike) green, leaf-like .... *Lycopodiella*

    2. Plants long creeping with more than one fertile upright branch; sporophylls (bracts of the spike) yellowish and scale-like.

        3. Leaves in 6 to 10 ranks, usually more than 4 mm long .... *Lycopodium*

        3. Leaves in 4 or 5 ranks, less than 4 mm long .... *Diphasiastrum*

DIPHASIASTRUM

1. Plants with long underground creeping rhizomes; stems strongly flattened and winged; the leaves on the concave side of the stems noticeably narrower than the leaves on the margins or on the convex sides .... *D. complanatum*

1. Plants with long above-ground rhizomes; stems round or slightly flattened, not winged; all leaves similar in size.

    2. Sporophyll cones unstalked; vegetative branches flattened; leaves of the apparently concave side trowel-shaped; plants usually bluish-green .... *D. alpinum*

    2. Sporophyll cones stalked; vegetative branches round; all leaves of about the same shape and size; plants usually light green .... *D. sitchense*

***Diphasiastrum alpinum* (L.) Holub** (*Lycopodium alpinum* L.)

alpine club-moss

HABITAT/RANGE:

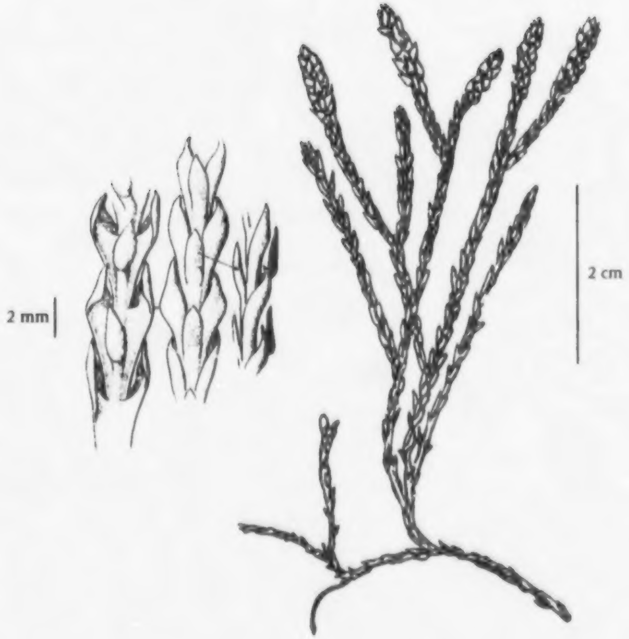
Open dry to mesic areas in heath and tundra communities in the subalpine and alpine zones; frequent throughout BC, except absent on the Queen Charlotte Islands; circumpolar, N to AK, YT, and NT, E to AB and S to MT, ID, and WA, disjunct to MI, PQ, NB, and NF; Eurasia.

DESCRIPTION:

General: Evergreen perennial from horizontal stems about 3 mm wide, on the soil (or rock) surface, or shallowly buried; upright shoots branched, 5-15 cm tall, bluish-green, with flattened branches.

Leaves: Leaves on the convex side of the branches and leaves on their edges unstalked, short, triangular, those on the concave sides trowel shaped, bent upright at right angles to their short stalks that are perpendicular to the branches, the leaves bent upright at right angles to the bases.

Sporophylls: In unstalked spikes at the end of upright branches, the spikes 1-5 cm long.



Diphasiastrum alpinum

***Diphasiastrum complanatum* (L.) Holub** (*Lycopodium complanatum* L.)

ground-cedar

HABITAT/RANGE:

Dry to mesic forests, rocky slopes, sandy openings and clearings, and margins of peat bogs in the lowland, steppe and montane zones; frequent throughout BC, rare on Vancouver Island and Queen Charlotte Islands; circumpolar, N to AK, YT and NT, E to NF and S to NY, MI, MT, and WA; Eurasia, S America.

DESCRIPTION:

General: Evergreen perennial from horizontal stems about 2 mm wide, shallowly buried; upright shoots branched several times more or less in one plane, 10-35 cm tall; branches flattened, sometimes darker green on the convex sides and lighter on the concave sides.

Leaves: Leaves on the convex side and on the edges of the branches triangular, unstalked, those on the concave side reduced and scale-like.

Sporophylls: In 1-4 spikes at the top of the stem, the spikes usually several, 1-5 cm long, on single or branched stalks.

***Diphasiastrum sitchense* (Rupr.) Holub** (*Lycopodium sitchense* Rupr., *L. sabinifolium* Willd. ssp. *sitchense* [Rupr.] Calder & Taylor)

Alaska club-moss

HABITAT/RANGE:

Mesic to moist heath communities, open forests, and tundra in the subalpine and alpine zones; common in BC in and W of the Coast-Cascade Mountains S of 55° N, rare northward; amphiberingian, N to AK and YT, E to NF and S to ME, NH, MT, ID and OR; E Asia.

DESCRIPTION:

General: Evergreen perennial from horizontal stems about 3 mm wide, creeping on the surface or shallowly buried in the soil; upright shoots branched, 5-15 cm tall, bright green and shiny; branches 4-5 ranked, not flattened.

Leaves: All alike, 3-5 mm long, lanceolate, pointed, stiff, unstalked.

Sporophylls: In 1-5 spikes on the top of erect stems, the spikes 1-3 cm long, on branched stalks.

HUPERZIA

1. Leaves 0.5 mm wide, lanceolate awl-shaped, thin, dark green with tips curved back .... *H. chinensis*
1. Leaves 1-1.5 mm wide, linear or lanceolate, firm, light or yellowish green, with straight or incurved tips.
    2. Leaves oblanceolate, broadest in their upper 1/3, loose, not appressed to the stem .... *H. occidentalis*
    2. Leaves lanceolate, broadest near their bases, appressed to the stem.
        3. Shoots with weak annual constrictions; gemmae-producing branchlets and gemmae (vegetative buds) formed in 1 pseudo-whorl at end of annual growth .... *H. selago*[11]
        3. Shoots without annual constrictions; gemmae-producing branchlets and gemmae produced throughout mature portion of shoot .... *H. haleakalae*

***Huperzia chinensis* (Christ) Czern.** (*H. miyoshiana* [Makino] Ching, *H. selago* [L.] Bernh. *ex* Schrank & Mart. ssp. *chinensis* [Christ] Löve & Löve, *Lycopodium selago* ssp. *miyoshianum* [Makino] Calder & Taylor)

Pacific fir-moss

HABITAT/RANGE:

Mesic to wet rocky places, cliff shelves, forests, and coastal bogs in the lowland to alpine zones; frequent in coastal BC; amphiberingian, N to AK and S to WA; E Asia.

DESCRIPTION:

General: Evergreen perennial from a short rhizome; stems dark olive green, 5 to 25 cm tall; shoots single or in loose clusters of 2 to 5, without noticeable annual constrictions, the young plants often arching with the tops pointing down.

Leaves: Lanceolate awl-shaped, less than 1 mm wide, 5-10 mm long, spreading to loosely ascending.

Gemmae and Sporangia: Produced in 2-3 pseudo-whorls at end of annual growth.

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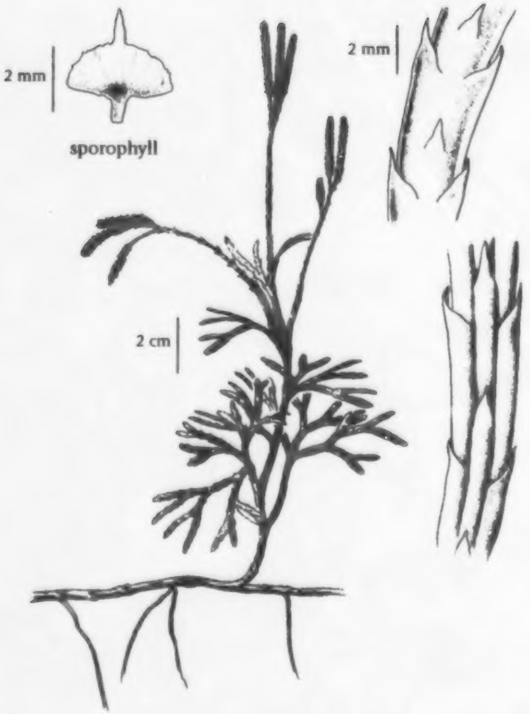
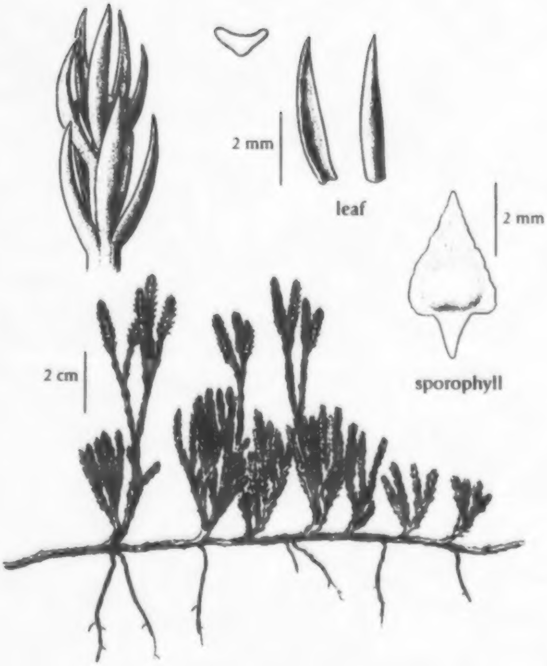
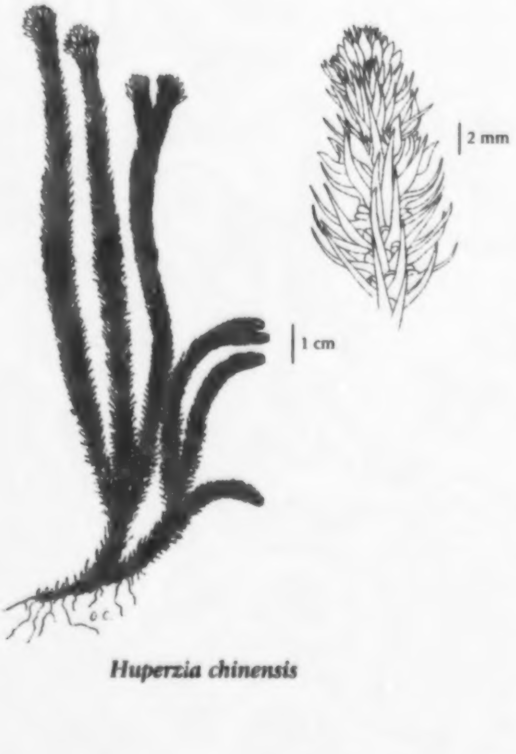
[11] This species was reported for BC by Wagner and Beitel (1993) but no voucher material is known. It has been included in this key since it may be found with further inventory in NE BC.


2 mm
sporophyll
2 mm
2 cm

Diphasiastrum complanatum


2 mm
leaf
2 mm
sporophyll
2 cm

Diphasiastrum sitchense



Huperzia chinensis

Huperzia haleakalae **(Brackenr.) Holub** (*H. selago* [L.] Bernh. *ex* Schrank & Mart. *sens. lat.*, *H. selago* ssp. *arctica* [Tolm.] Löve & Löve, *Lycopodium selago* L. ssp. *patens* [Beauv.] Calder & Taylor)

alpine fir-moss

HABITAT/RANGE:

Dry rocky places, cliff shelves and heath in the subalpine and alpine zones; infrequent throughout BC; N to AK, YT and NT.

DESCRIPTION:

General: Evergreen perennial from a short rhizome; stems yellow-green to brown-green, in dense clusters of 5 to 10 (or more), 5-10 cm tall, without annual constrictions.

Leaves: Lanceolate or egg-shaped, broadest at the bases, with broadly pointed tips, about 4-6 mm long, appressed to the stem.

Gemmae and Sporangia: Produced in pseudo-whorls throughout mature portions of the shoots.

Huperzia occidentalis **(Clute) Kartesz & Gandhi** (*Lycopodium lucidulum* Michx. var. *occidentale* [Clute] L. R. Wilson)

western fir-moss

HABITAT/RANGE:

Mesic to moist open coniferous forests, rocky places, bogs from the lowland to subalpine zones; infrequent in BC south of 56° N; N to AK, E to W AB and S to ID and OR.

DESCRIPTION:

General: Evergreen perennial plant from a short rhizome; stems yellow-green or dark-green, single or in clusters of 2 to 7, 10-30 cm tall, with distinct annual constrictions.

Leaves: Lanceolate, about 2 mm wide, broadest in upper 1/3, with pointed tips, bent back or spreading.

Gemmae and Sporangia: Produced in 1 pseudo-whorl at the end of the annual growth.

LYCOPODIELLA

Lycopodiella inundata **(L.) Holub** (*Lycopodium inundatum* L.)

bog club-moss

HABITAT/RANGE:

Peat bogs, pools in peatland, and lake margins in the lowland and montane zones; frequent in coastal BC, rare in C BC (Wells Grey Park area, upper Adams River); essentially circumpolar, but widely disjunct, N to SE AK, E to NF, and S to MD, VA, MT, and CA; Europe, Japan.

DESCRIPTION:

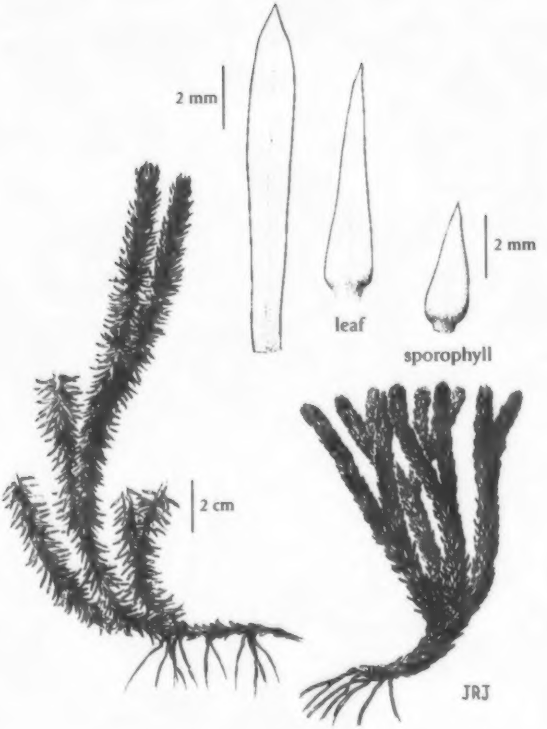
General: Evergreen perennial from a short rhizome; stems low, creeping, pale grey-green to yellow-green, 3-7 cm long with fertile parts erect.

Leaves: Narrow, curved, pointed, 5-6 mm long.

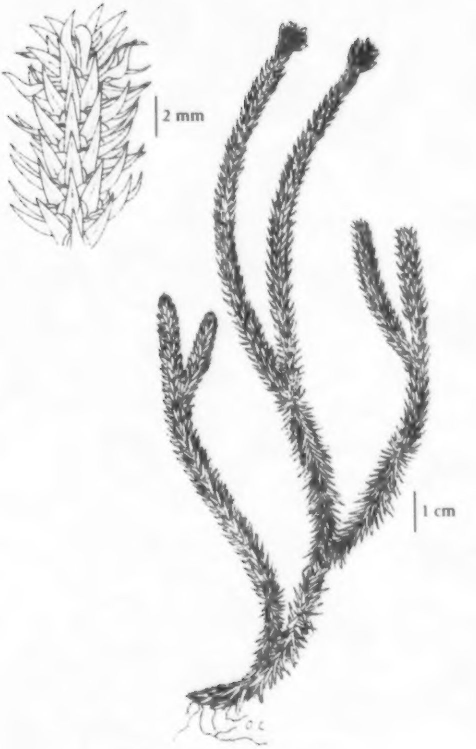
Sporophylls: In 2-cm spikes on short, upright, 3-7 mm stalks.

LYCOPODIUM

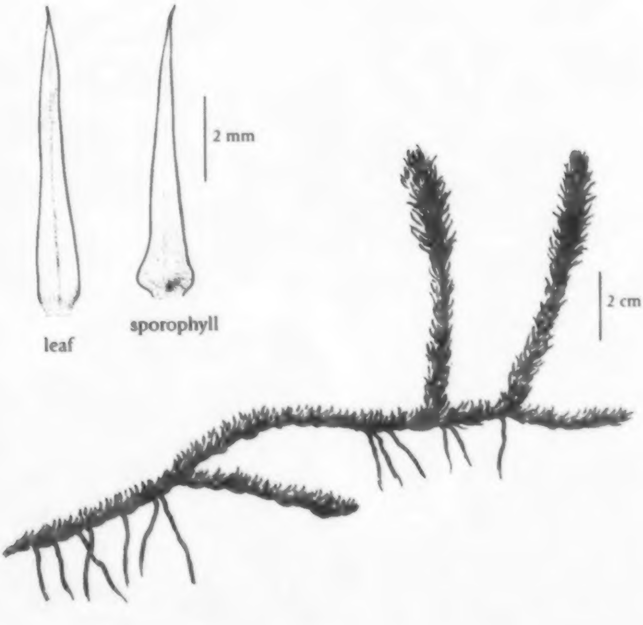
1. Stems upright, branched in a tree-like fashion .... *L. dendroideum*
1. Stems decumbent, or ascending, but not branched in a tree-like fashion.
    2. Cones stalked, one or several on each fertile branch; midrib of the leaf extends into a long whitish hair (no hairs in *L. clavatum* var. *integerrimum*), the tips of the leaves entire.
        3. Plants with only one cone on each fertile branch .... *L. lagopus*
        3. Plants with two or more cones on each fertile branch .... *L. clavatum*
    2. Cones unstalked, one on each fertile branch; leaves without whitish hairs, the apical parts of the leaves slightly saw-toothed, or entire .... *L. annotinum*


2 mm
leaf
2 mm
sporophyll
2 cm
JRJ

Huperzia haleakalae



Huperzia occidentalis


2 mm
leaf
sporophyll
2 cm

Lycopodiella inundata

Lycopodium annotinum **L.** (*L. dubium* Zoega, *L. pungens* La Pylaie *ex* Iljin)

stiff club-moss

HABITAT/RANGE:

Dry to moist coniferous forests, heath, wet peat bogs and rock outcrops in the lowland to subalpine zones; common throughout BC; circumpolar, N to AK, YT, NT, E to NF and S to NC, WV, ID, and OR, disjunct in NM; Eurasia.

DESCRIPTION:

General: Evergreen perennial; stems horizontal, long-creeping, branched; erect branches with numerous leaves, 5-25 cm tall.

Leaves: Linear-lanceolate, 3-10 mm long, with 1-3 small irregular teeth close to the tips, the tips without bristles.

Cones: 1-4 cm long, single, unstalked at the top of upright branches; sporophylls broadly egg-shaped with fringed margins.

Notes: A variable species. In this treatment it includes *Lycopodium dubium* Zoega, which is treated by some authors as a separate species.

Lycopodium clavatum **L.**

running club-moss

HABITAT/RANGE:

Dry to moist open places, forest clearings, roadcuts, forests, heath and bogs in the lowland and steppe to subalpine and rarely alpine zones; frequent throughout BC, infrequent in SC BC; cosmopolitan, N to AK, YT and NT, E to NF and S to WV, MI, WI, MT, ID and N CA; Europe, Asia, Africa, S America.

DESCRIPTION:

General: Evergreen perennial; stems horizontal, long-creeping, branched; erect branches with numerous leaves, 10-25 cm tall.

Leaves: Linear, 3-5 mm long, entire, with tips bending back to the stem, the tips usually with long white hairs.

Cones: 2-6 cm long, 2-5 at the end of long stalks.

Notes: Two varieties occur in BC:

1. Tips of the leaves with a whitish hair .... var. *clavatum*

1. Tips of the leaves lacking a whitish hair .... *var. integerrimum* Goldie

Lycopodium dendroideum **Michx.** (*L. obscurum* L. var. *dendroideum* [Michx.] D.C. Eaton)

ground-pine

HABITAT/RANGE:

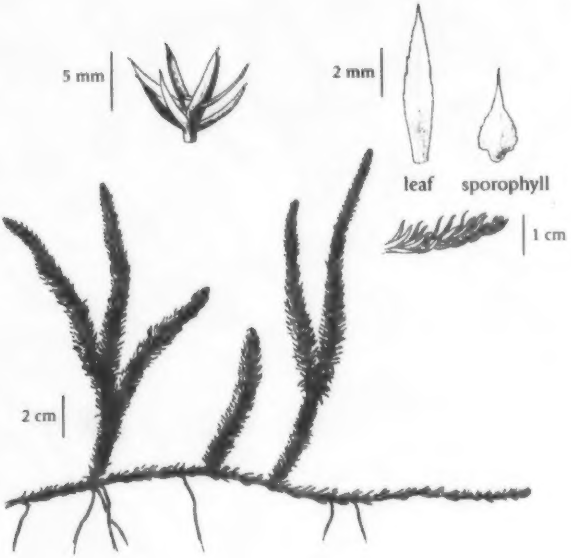
Dry to moist forests, bog edges, rocky or sandy places in the lowland to montane zones; frequent on N coast and in C BC, infrequent elsewhere; amphiberingian, N to AK, YT and NT, E to NF and S to MA. NH, PA, NC, TN, MO, SD, WY, ID and WA; E Asia.

DESCRIPTION:

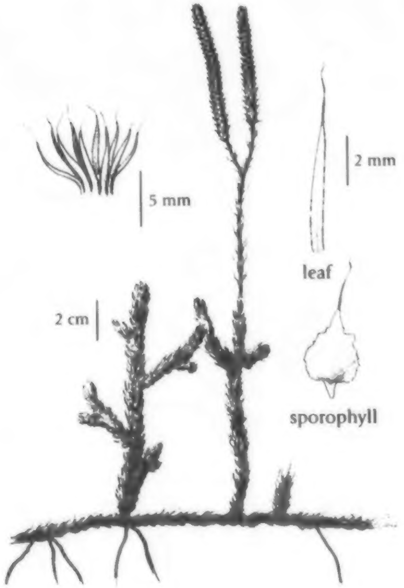
General: Evergreen perennial; stems horizontal, underground; upright branches branched again in tree-like fashion.

Leaves: Needle-like, 1-4 mm long, spreading.

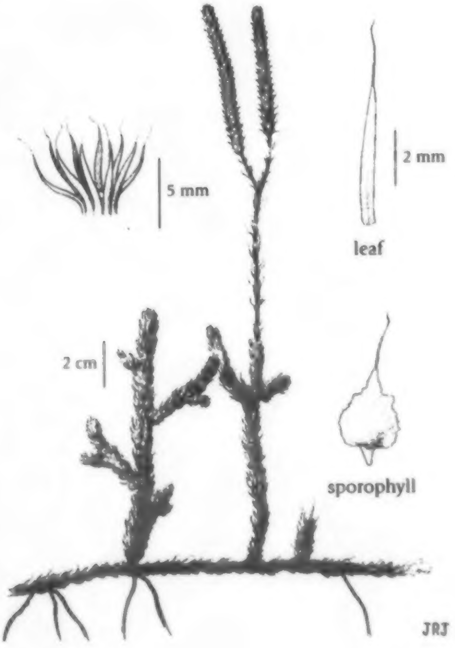
Cones: 1-5 cm long, unstalked at the end of upright shoots.


5 mm
2 mm
leaf
sporophyll
1 cm
2 cm

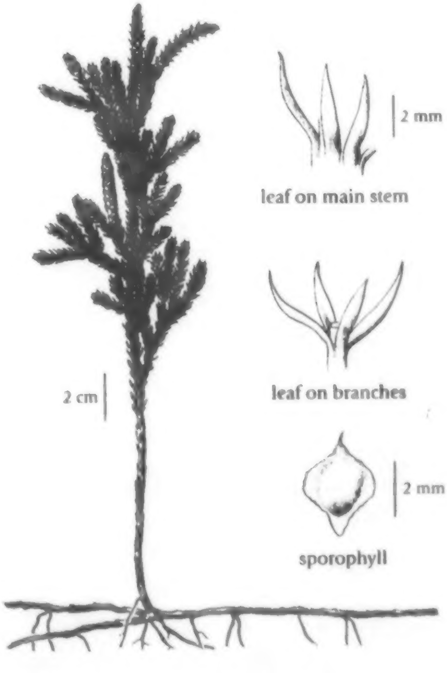
Lycopodium annotinum


2 mm
5 mm
leaf
2 cm
sporophyll

Lycopodium clavatum var. *clavatum*


2 mm
5 mm
leaf
2 cm
sporophyll
JRJ

Lycopodium clavatum var. integerrimum


2 mm
leaf on main stem
leaf on branches
2 cm
2 mm
sporophyll

Lycopodium dendroideum

***Lycopodium lagopus* (Laest. *ex* Hartm.) Zinserl. *ex* Kuzen.** (*L. clavatum* var. *monostachyon* Grev. & Hook. ssp. *monostachyon* Selander, *L. clavatum* f. *lagopus* Laest.)

ptarmigan club-moss

HABITAT/RANGE:

Dry to moist open places, forest clearings, roadcuts, forests, heath and bogs in the lowland and steppe to subalpine and rarely alpine zones; infrequent throughout BC; circumpolar, N to AK, YT and NT, E to NF and S to PA, OH, IN, MN, ND, WY and OR; Greenland, Europe, Asia.

DESCRIPTION:

General: Evergreen perennial; stems horizontal, long-creeping, branched; erect branches with numerous leaves, 10-25 cm tall.

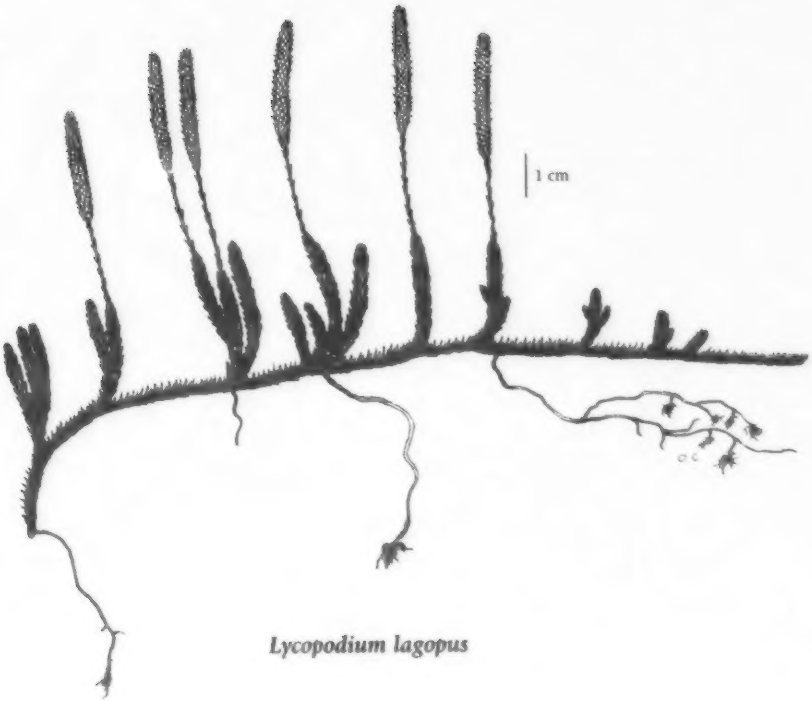
Leaves: Linear, 3-5 mm long, entire, with tips bending back to the stem, the tips with a whitish hair.

Cones: 2-6 cm long, single at the end of a short stalk.

SELAGINELLACEAE

SELAGINELLA

1. Cones stalked, circular in cross-section; leaves flat without grooved midveins, with 2 to 4 small teeth on each side at the tips, midveins not extending into bristles .... *S. selaginoides*
1. Cones unstalked, rectangular in cross-section; leaves with grooved midveins, without teeth near the tips, midveins extending into apical bristles.
    2. Leaves distinct from stems in colour, their bases abruptly attached, not decurrent except on the top of the branches .... *S. wallacei*
    2. Leaves about the same colour as the stems, strongly decurrent.
        3. Leaves attached to the stem for nearly 1/2 of their length; plants with long branches, forming loose mats; usually epiphytic on trunks and branches of trees .... *S. oregana*
        3. Leaves attached to the stem for less than 1/4 of their length; plants with short branches' forming dense mats; terrestrial on soil or rocks.
            4. Leaf tips with bristles less than 1 mm long; branches intricate, bearing scattered roots .... *S. sibirica*
            4. Leaf tips with bristles at least 1 mm long; branches discrete, without scattered roots.
                5. Sporophylls minutely toothed to fringed with soft hairs from the base to the tips; leaf tips with conspicuously short-hairy bristles .... *S. densa*
                5. Sporophylls fringed only at the base; leaf tips with slightly short-hairy or entire bristles.
                    6. Sporophylls broadly lanceolate, seldom egg-shaped, margins minutely toothed or fringed only to mid-length, the tips entire; leaf bristles grey .... *S. scopulorum*
                    6. Sporophylls triangular egg-shaped, margins short-fringed to minutely toothed to the tips; leaf bristles yellowish .... *S. standleyi*



Lycopodium lagopus

Selaginella densa **Rydb.**

common selaginella

HABITAT/RANGE:

Dry soil and rocks in the steppe and montane zones; frequent in SC BC; E to SE ON and S to OK, NM and AZ.

DESCRIPTION:

General: Evergreen perennial forming dense flat circular mats 5-20 cm across, 1-3 cm tall.

Leaves: Lanceolate, 1.5-2 mm long, 0.4-0.7 mm wide, margins fringed with long hairs and with white, 0.5-1.5 mm long, short-hairy, bristle tips.

Cones: Unstalked, tetragonal, 5-20 mm long, 1-2 mm wide; sporophylls egg-shaped to lanceolate with fringed margins and long-bristled tips.

Selaginella oregana **D.C. Eaton**

Oregon selaginella

HABITAT/RANGE:

Moist tree trunks and branches and shady rocks in the lowland zone; rare in coastal BC, known only from the Queen Charlotte Islands and Broken Islands (Barkley Sound); S to N CA.

DESCRIPTION:

General: Evergreen perennial forming loose chains or strips, 5-40 cm long.

Leaves: Lanceolate, 2-3 mm long, 0.4-0.6 mm wide with bristle tips either lacking or short, less than 0.3 mm long.

Cones: Unstalked, 4-angled in cross-section, 5-20 mm long, 1-2 mm wide; sporophylls lanceolate, short-fringed to minutely toothed except entire towards the bases and tips.

Selaginella scopulorum **Maxon** (*S. densa* Rydb. var. *scopulorum* [Maxon] R.M. Tryon)

cliff selaginella

HABITAT/RANGE:

Dry to moist rocks and shallow soil in open places in the montane to alpine zones; infrequent throughout BC; E to AB, S to TX, NM, AZ and CA.

DESCRIPTION:

General: Evergreen perennial forming dense flat circular mats 5-20 cm across, 1-3 cm tall.

Leaves: Lanceolate, 1.5-2 mm long, 0.4-0.7 mm wide, those on the upper side of stem slightly smaller than those on the lower side, with short-fringed margins and whitish, transparent to opaque, 1-1.5 mm long bristle tips.

Cones: Unstalked, 4-angled in cross-section, 5-30 mm long, 1-2 mm wide; sporophylls strongly keeled, lanceolate to broadly lanceolate, margins short fringed at the bases, lacking fringing hairs in the upper part and with short bristles at the tips.

Notes: Previously treated as a variety or subspecies of *S. densa*.

Selaginella selaginoides **(L.) Beauv. *ex* Martius & Schrank**

mountain-moss

HABITAT/RANGE:

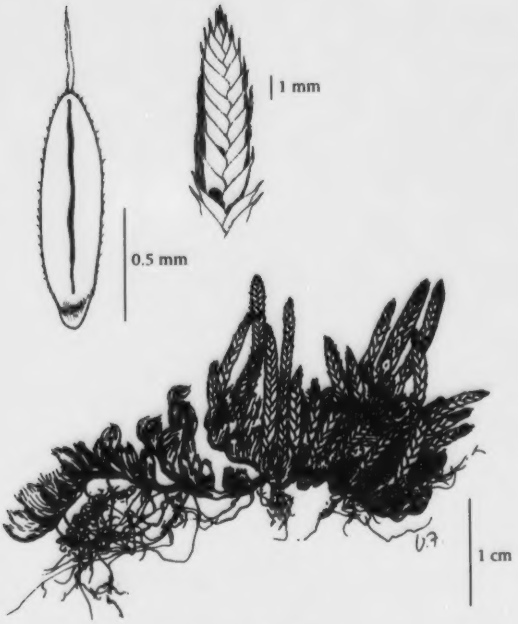
Wet meadows, fens, peat bogs or boggy lake shores in the lowland to montane zones; infrequent in BC, occurring mostly on the coast and in the Rocky Mountains; circumpolar, N to AK, YT and NT, E to NF and S to ME, MI, MN, CO, ID and NV; Eurasia.

DESCRIPTION:

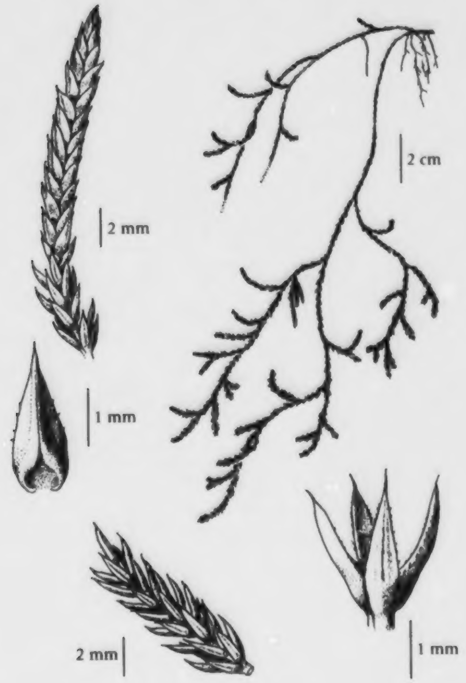
General: Perennial, sending up erect, annual, deciduous fertile branches, 1-7 cm long.

Leaves: Broadly lanceolate, 1-3 mm long, 0.5-0.8 mm wide, margins sparsely toothed along with pointed tips.

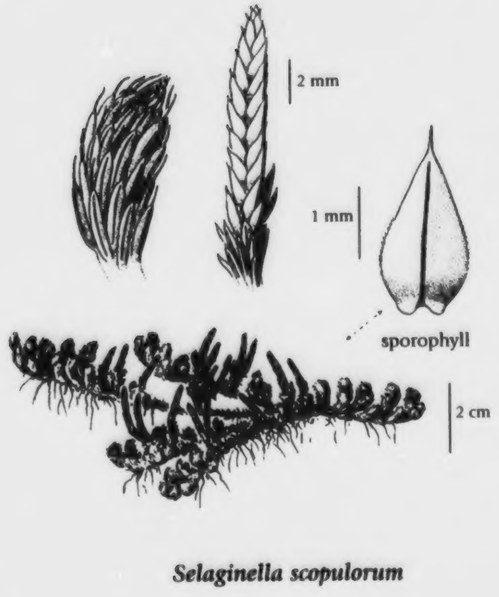
Cones: Unstalked, cylindrical, 0.5-4 cm long, 4-6 mm wide; sporophylls loose and spreading, similar to the sterile leaves.


1 mm
0.5 mm
V.7.
1 cm

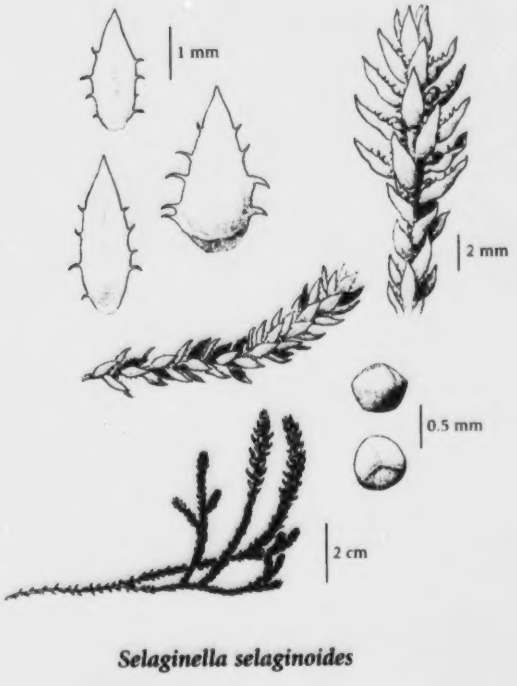
Selaginella densa


2 cm
2 mm
1 mm
2 mm
1 mm

Selaginella oregana


2 mm
1 mm
sporophyll
2 cm

Selaginella scopulorum


1 mm
2 mm
0.5 mm
2 cm

Selaginella selaginoides

***Selaginella sibirica* (Milde) Hieron.**

northern selaginella

HABITAT/RANGE:

Dry rocks or rocky soil in the alpine zone; infrequent in N BC; amphiberingian, N to AK, YT and W NT; E Asia.

DESCRIPTION:

General: Evergreen perennial forming long-spreading mats 5-20 cm across, 1-3 cm tall.

Leaves: Linear-lanceolate, 1.5-3.5 mm long, 0.3-0.5 mm wide, somewhat tapered at the bases, margins long-fringed and with white, 0.2-0.8 mm long bristle tips.

Cones: Unstalked, 4-angled in cross-section, 5-20 mm long, 1-2 mm wide; sporophylls triangular, egg-shaped to broadly-lanceolate, margins broad, transparent, entire at the base and fringed with hairs towards the tips, the tips with short bristles.

***Selaginella standleyi* Maxon** (*S. densa* Rydb. var. *standleyi* [Maxon] R.M. Tryon)

Standley's selaginella

HABITAT/RANGE:

Moist to dry rocks and shallow soil in open places in the subalpine and alpine zones; infrequent in the Rocky Mountains of BC; N to AK, E to AB and S to CO and ID.

DESCRIPTION:

General: Evergreen perennial forming cushion-like or loose mats 5-20 cm across.

Leaves: Lanceolate, 2.5-4 mm long, margins short-fringed to minutely toothed and with yellowish, 0.5-1.2 mm long bristle tips.

Cones: Unstalked, 4-angled in cross-section, 5-20 mm long, 1-2 mm wide; sporophylls strongly keeled, margins short-fringed to minutely toothed on upper 3/4, abruptly bristled at the tips.

Notes: Previously treated as a variety or subspecies of *S. densa*.

***Selaginella wallacei* Hieron.**

Wallace's selaginella

HABITAT/RANGE:

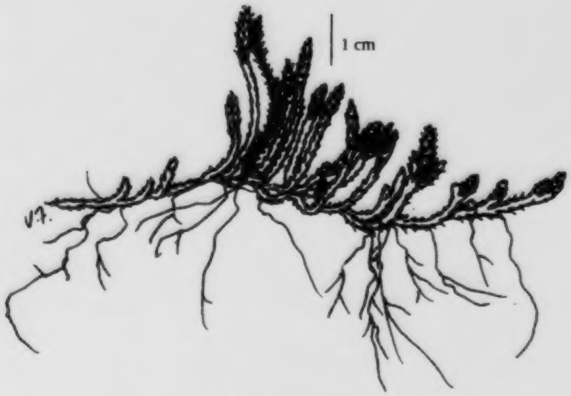
Dry rocks and rocky soil from the lowland and steppe to subalpine zones; frequent in S BC; E to SW AB and S to MT, ID and N CA.

DESCRIPTION:

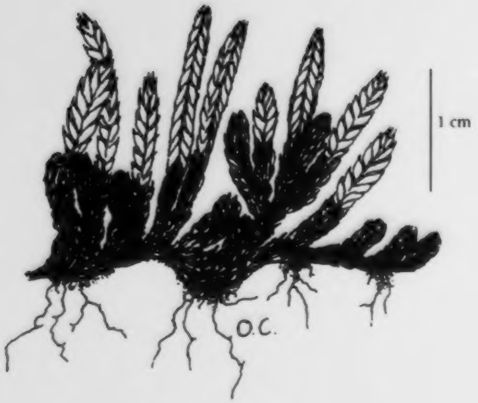
General: Evergreen perennial forming loose spreading mats with branches 10-40 cm long.

Leaves: Lanceolate, 1.5-2 mm long, abruptly attached, margin short-fringed or minutely toothed with short, 0.5 mm long bristle tips.

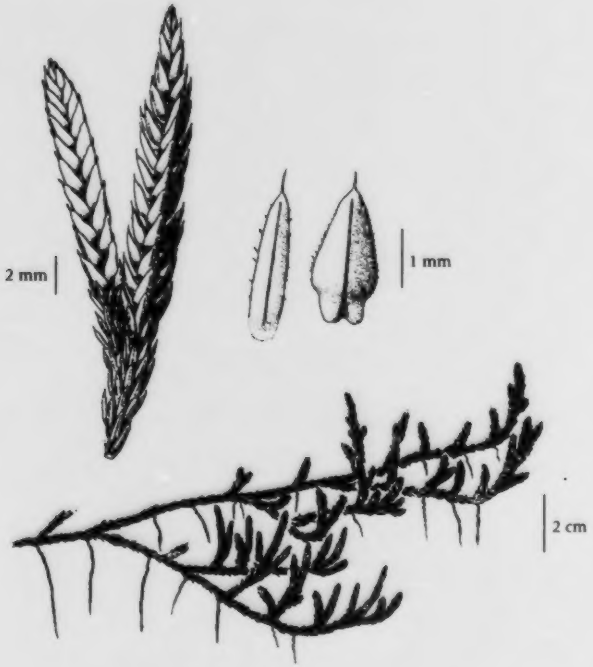
Cones: Unstalked, 4-angled in cross-section, 1-7 cm long, 12 mm wide; sporophylls triangular egg-shaped, margins fringed or toothed and with abrupt bristles at the tips.



Selaginella sibirica



Selaginella standleyi



Selaginella wallacei

POLYPODIOPHYTA

OPHIOGLOSSOPSIDA

OPHIOGLOSSACEAE[12, 13]

1. Veins free; trophophores (sterile blades) lobed to pinnate (rarely simple); sporophores (fertile segments) branched, with fully exposed sporangia .... *Botrychium*

1. Veins forming a network; trophophores (sterile blades) simple and unlobed; sporophores (fertile segments) unbranched, with embedded sporangia .... *Ophioglossum*

BOTRYCHIUM[14, 15]

1. Trophophores absent, replaced by sporophores, resulting in 2 sporophores .... *B. paradoxum*

1. Trophophores present, rarely with a few sporangia near the base, fully distinct from the sporophores.

  2. Trophophores 4- to 5- pinnate.

    3. Trophophores wintergreen, thick and leathery, stalked, ... *B. multifidum*

    3. Trophophores deciduous, thin and herbaceous, stalked or unstalked.

      4. Tropophores stalked, attached near ground level, the segments egg-shaped, shallowly toothed or entire .... *B. silaifolium*

      4. Trophophores unstalked, attached well above ground level, the segments lanceolate to linear-lanceolate, coarsely toothed .... *B. virginianum*

  2. Trophophores less than 4-pinnate.

    5. Trophophores 1-pinnate or simple.

      6. Trophophores simple or nearly so, nearly unstalked .... *B. simplex*

      6. Trophophores 1-pinnate.

        7. Basal pinnae broadly fan-shaped, semicircular in shape.

          8. Pinnae usually overlapping, the margins entire, sometimes undulate, rarely sharp-toothed .... *B. lunaria*

          8. Pinnae well separated, the margins usually minutely round- to sharp-toothed .... *B. crenulatum*

        7. Basal pinnae narrowly fan-shaped, wedgelike.

          9. Trophophores diamond-shaped to oblong. .... *B. montanum*

          9. Trophophores lanceolate, narrowly oblong or triangular.

            10. Pinnae strongly ascending .... *B. ascendens*

            10. Pinnae spreading or only moderately ascending.

---

[12] The leaves of this family are unique in having two parts – a sterile photosynthetic blade (trophophore) and spore-bearing segment (sporophore) that arise from the common stalk.

[13] Contributed by A. Ceska and G.W. Douglas.

[14] The taxonomy and distribution of *Botrychium* species in British Columbia is still poorly known. This is a preliminary treatment of British Columbia taxa.

[15] Key adapted from Wagner & Wagner (1993).

11. Pinnae spoon-shaped to narrowly spoon-shaped .... *B. spathulatum*

11. Pinnae spherical or fan-shaped.

    12. Trophophores usually triangular; pinnae usually overlapping .... *B. simplex*

    12. Trophophores narrowly oblong, pinnae well separated ...... *B. minganense*

5. Trophophores 2-pinnate.

  13. Trophophores triangular-shaped; sporophores divided into several equally long branches .... *B. lanceolatum*

  13. Trophophores oblong, lanceolate, egg-shaped or sometimes triangular-shaped (*B. hesperium and B. pinnatum*); sporophores with a single midrib, this midrib sometimes with 2 smaller, less conspicuous ribs.

    14. Trophophores long-stalked, the stalks equal to or 1/2 the length of the blades .... *B. pedunculosum*

    14. Trophophores unstalked or short-stalked, the stalks less than 1/4 the length of the blades.

      15. Trophophores bright, shiny green; the lowest pinnae similar in size .... *B. pinnatum*

      15. Trophophores dull, grey-green; the lowest pinnae dissimilar in size .... *B. hesperium*

Botrychium ascendens **W.H. Wagner**

upswept moonwort

HABITAT/RANGE:

Mesic to moist grassy fields and meadows in the lowland and montane zones; rare in SW and SE BC; N to AK, disjunct in ON, S to CO, ID, NV and CA.

DESCRIPTION:

General: Deciduous perennial, 5-13 cm tall.

Trophophores: Lanceolate, short stalked, the tips toothed; blades 1-pinnate; pinnae in 3 to 5 well-separated pairs, strongly ascending with minutely toothed margins, often shallowly incised.

Sporophores: 2-pinnate, 1.5-2 times the length of trophophores.

Botrychium crenulatum **W.H. Wagner**

dainty moonwort

HABITAT/RANGE:

Marshy meadows and springy places in the montane zone; rare in NE (Fort Nelson) and SE BC (Flathead River area); S to WY, AZ and CA.

DESCRIPTION:

General: Deciduous perennial, 1-10 cm tall.

Trophophores: Lanceolate, stalks 0.5-7 mm long; blades oblong, 1-pinnate, up to 6 cm long; pinnae to 5 pairs, well separated, with minutely round-toothed to sharp-toothed margins.

Sporophores: 1- to 2-pinnate, 1.3-3 times length of trophophores.

Botrychium hesperium **(Maxon & Clausen) W. H. Wagner & Lellinger** (*B. matricariifolium* [A. Braun] A. Braun ssp. *hesperium* Maxon & Clausen)

western moonwort

HABITAT/RANGE:

Mesic grassy slopes in montane to subalpine zones; rare in SC and SE BC; E to ON and S to MI, MN, CO and AZ, disjunct in ON and MI.

DESCRIPTION:

General: Deciduous perennial, 3-15 cm tall.

Trophophores: Triangular-shaped to narrowly oblong, dull, grey-green, the stalks up to 1/4 the length of the trophophores; blades 1- to 2-pinnate, up to 6 cm long and up to 5 cm wide; pinnae to 6 pairs, usually approximate or overlapping, with entire or slightly lobed margins; the basal pair of pinnae, dissimilar in size, commonly much larger and more divided than the adjacent pair.

Sporophores: 1- to 3-pinnate, 2-3 times length of trophophores, with a single midrib, this midrib sometimes with 2 smaller, less conspicious ribs.

Botrychium lanceolatum **(Gmel.) Angstr. ssp. *lanceolatum***

triangle moonwort

HABITAT/RANGE:

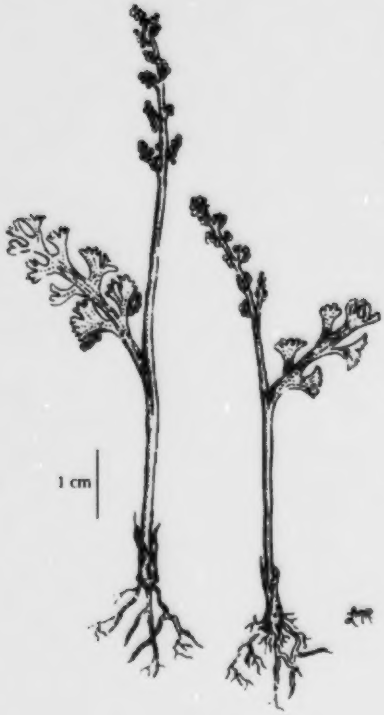
Mesic to wet rocky slopes, meadows and woods in the montane to subalpine zones; infrequent throughout BC; circumpolar, N to AK and YT, E to SK and S to NM, AZ and CA; Eurasia.

DESCRIPTION:

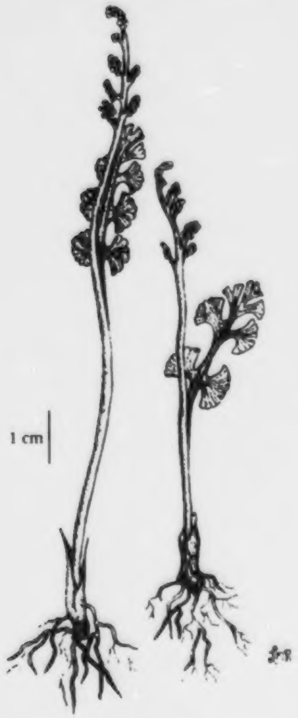
General: Deciduous perennial, 3-25 cm tall.

Trophophores: Triangular-shaped, unstalked or nearly so; the blades green to pale yellow-green, broad, coarse, succulent, 1- to 2-pinnate with up to 5 pairs of pinnae, the first pair of pinnae longest; margins with distinct lobes, lobes with pointed tips.

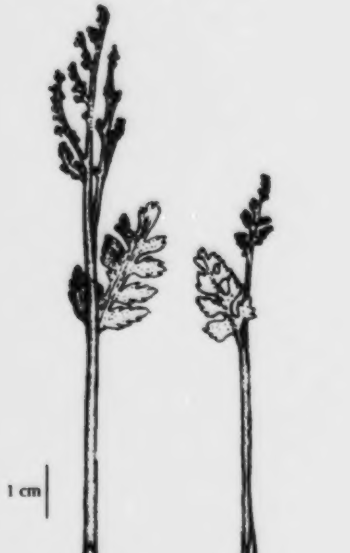
Sporophores: 1- to 3-pinnate, 1-2.5 times length of trophophores, divided into several equally long branches.



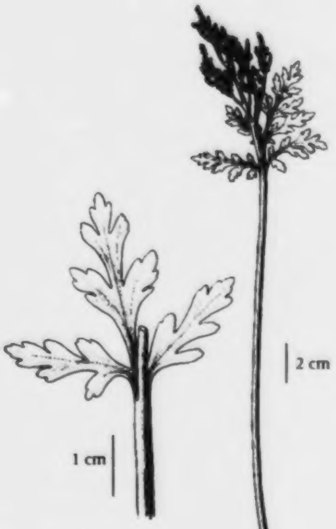
Botrychium ascendens



Botrychium crenulatum



Botrychium hesperium



Botrychium lanceolatum ssp. *lanceolatum*

Botrychium lunaria **(L.) Sw.**

common moonwort

HABITAT/RANGE:

Mesic to moist woods, meadows, grassy slopes and heath from the montane to alpine zones; infrequent in BC; circumpolar, N to AK, YT and NT, E to NF and S to ME, PA, MI, WI, MN, ND, NM, AZ and CA; Eurasia, Australia, New Zealand, Patagonia.

DESCRIPTION:

General: Deciduous perennial, 2-20 cm tall.

Trophophores: Oblong, unstalked or short stalked, 1-pinnate, up to 12 cm long; pinnae up to 10 pairs, overlapping, semicircular, entire or sometimes undulate or rarely slightly toothed.

Sporophores: 1- to 2-pinnate, 0.8-2 times length of trophophores.

Botrychium minganense **Vict.** (*B. lunaria* var. *minganense* [Vict.] Dole, *B. lunaria* ssp. *minganense* [Vict.] Calder & Taylor)

Mingan moonwort

HABITAT/RANGE:

Mesic to wet woods, meadows, in the montane to alpine zones; infrequent in BC; N to AK, YT and NT, E to NF and S to NY, MI, WI, MN, ND, CO, AZ and CA.

DESCRIPTION:

General: Deciduous perennial, 3-10 cm tall.

Trophophores: Narrowly oblong, unstalked or short stalked, 1-pinnate, up to 12 cm long; pinnae up to 10 pairs, well separated, semicircular to fan-shaped, entire or slightly toothed with rounded tips.

Sporophores: 1- to 2-pinnate, 1-2.5 times length of trophophores.

Botrychium montanum **W.H. Wagner**

mountain moonwort

HABITAT/RANGE:

Mesic, shady coniferous forests in the upper montane and lower subalpine zones; rare in SC BC (Wells Grey Park); S to MT, ID and CA.

DESCRIPTION:

General: Deciduous perennial, 2-10 cm tall.

Trophophores: Diamond-shaped to oblong, short stalked; blades oblong, 1-pinnate or merely lobed, up to 5 cm long, succulent; pinnae or lobes up to 3 pairs, separated, linear or fan-shaped, basal ones narrowly fan-shaped with 2-3 teeth.

Sporophores: 1-pinnate, 1.5-4.5 times length of trophophores.

Notes: This is a recently described species. Its taxonomy and distribution need further study.

Botrychium multifidum **(Gmel.) Rupr.** (*Sceptridium multifidum* [Gmel.] Tagawa, *B. occidentale* Underwood, *B. ternatum* var. *intermedium* Eaton)

leathery grape fern

HABITAT/RANGE:

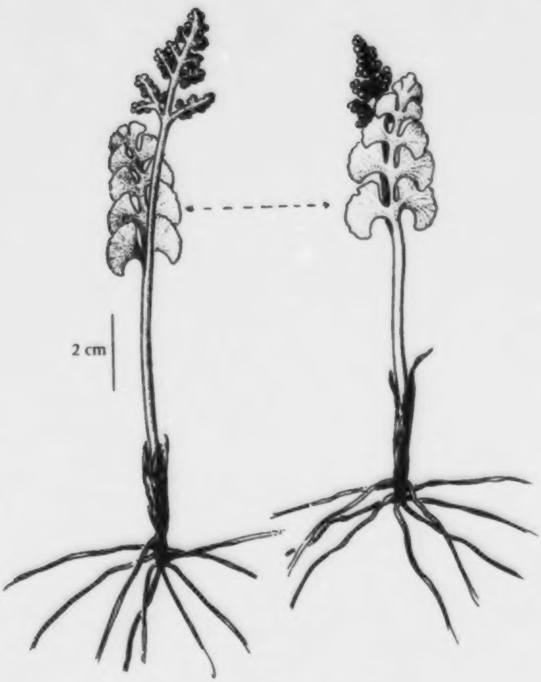
Moist to wet meadows, grassy clearings lake margins, riverbanks, alluvial forests in the lowland and montane zones; frequent south of 55° N; circumpolar, N to AK, E to NF and S to MA, NY, WV, OH, IL, IA, SD, CO, AZ and CA; Eurasia.

DESCRIPTION:

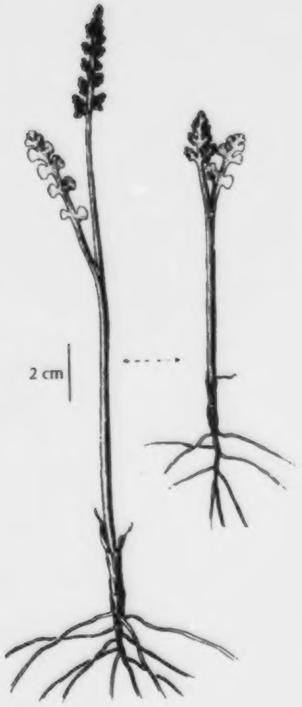
General: Evergreen perennial, 7-30 cm tall.

Trophophores: Broadly triangular, stalks 2-15 cm long, wintergreen, thick, leathery, smooth, ternate and 3- to 4-pinnate up to 25-35 cm long and about as wide; pinnae to 10 pairs, all in the plane of the blade; pinnules lopsided egg-shaped, rounded with entire margins.

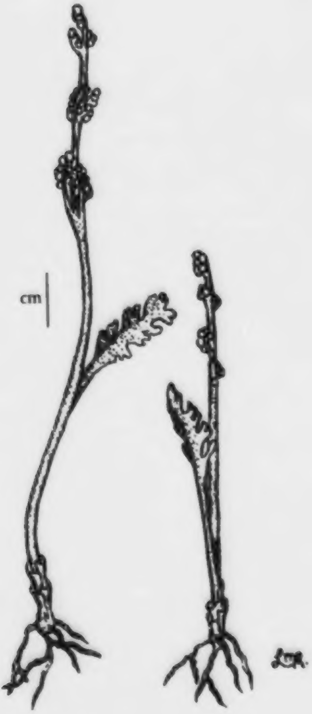
Sporophores: 2- to 3-pinnate, 1.2-2 times length of trophophores.



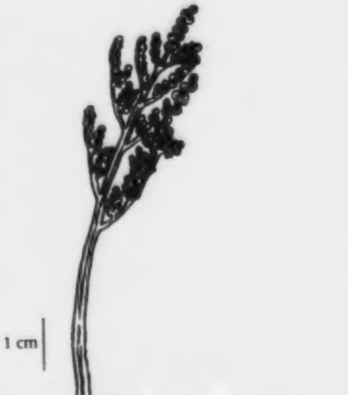
Botrychium lunaria



Botrychium minganense



Botrychium montanum



Botrychium multifidum

***Botrychium paradoxum* W.H. Wagner**

two-spiked moonwort

HABITAT/RANGE:

Mesic to moist sedge meadows in the subalpine zone; rare in SC BC, known only from Juniper Creek (Ashnola River) and Mt. Kobau; E to SK and S to MT, UT, ID and OR.

DESCRIPTION:

General: Deciduous perennial, 2-10 cm tall.

Trophophores: Entirely converted into a second fertile segment.

Sporophores: Double, 2 per leaf, 1-pinnate, 0.5-4 cm long.

***Botrychium pedunculosum* W.H. Wagner**

stalked moonwort

HABITAT/RANGE:

Moist to wet meadows and margins of willow thickets in the montane zone; rare in WC (Skeena River) and EC BC (Quesnel area); E to SK and S to MT, ID, and OR.

DESCRIPTION:

General: Deciduous perennial, 5-25 cm tall.

Trophophores: Broadly triangular or egg-shaped, with stalk from 1 cm long to slightly longer than the trophophore blades, 1-pinnate, up to 6 cm long; pinnae to 5 pairs, approximate to well separated, with entire margins and rounded tips.

Sporophores: 1- to 3-pinnate, 2-4 times length of trophophores.

Notes: Recently described, its distribution in British Columbia is poorly known.

***Botrychium pinnatum* St. John** (*B. boreale auct. non* [Fries] Milde, *B. boreale* var. *obtusilobum* [Rupr.] Broun)

northwestern moonwort

HABITAT/RANGE:

Mesic to moist stream banks, meadows and heath in the montane and subalpine zones; infrequent throughout BC; N to AK, YT and NT and S to CO, AZ and CA.

DESCRIPTION:

General: Deciduous perennial, 3-15 cm tall.

Trophophores: Broadly triangular or egg-shaped, unstalked or short stalked, 1- to 2-pinnate, up to 8 cm long; pinnae to 8 pairs, approximate or overlapping, with entire or slightly lobed margins and rounded tips, the lowest similar in size.

Sporophores: 2-pinnate, about 2 times length of trophophores.

Notes: The only North American collections of *Botrychium boreale* Milde have been recently collected in Kootenay National Park, SE BC (W.H. Wagner, pers. comm.). It is difficult to separate from *B. pinnatum*, but the lowermost pinnae have shallow, narrow sinuses (they are wide and deep in *B. pinnatum*).

***Botrychium silaifolium* K.B. Presl** (*B. multifidum* ssp. *silaifolium* [C. Presl] Clausen)

celery moonwort

HABITAT/RANGE:

Peat bogs; infrequent in coastal BC; N to AK, S to WA.

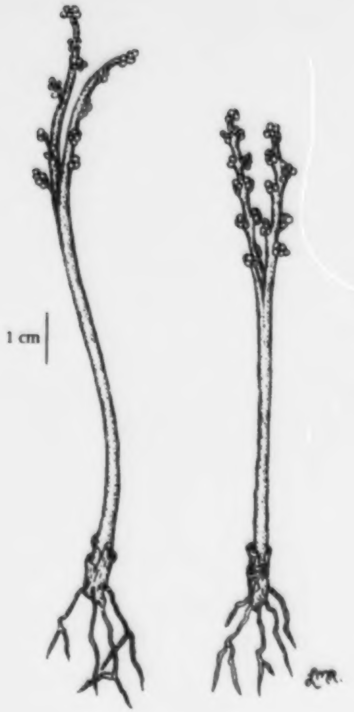
DESCRIPTION:

General: Deciduous perennial, 10-40 cm tall.

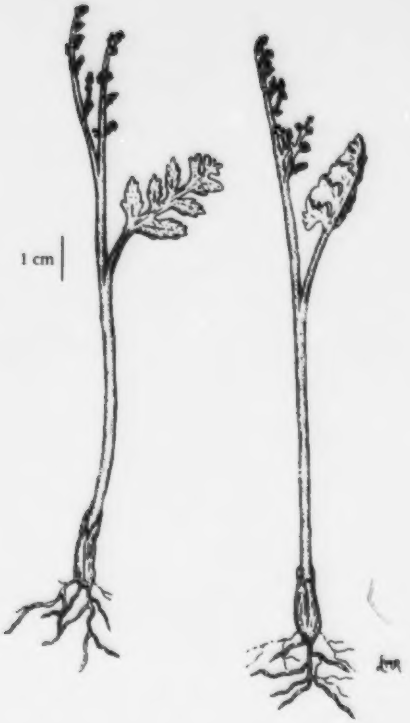
Trophophores: Triangular, with 2-15 cm long stalks, hairy at the bases and along the axis of the blades, with 3 main dubdivisions and 3- to 4-pinnate, up to 25-35 cm long and about as wide; pinnae to 10 pairs, twisted in an angle to the plane of the blade; deciduous, thin, herbaceous, pinnules lanceolate with shallowly toothed margins.

Sporophores: 2- to 4-pinnate, 2-3 times length of trophophores.

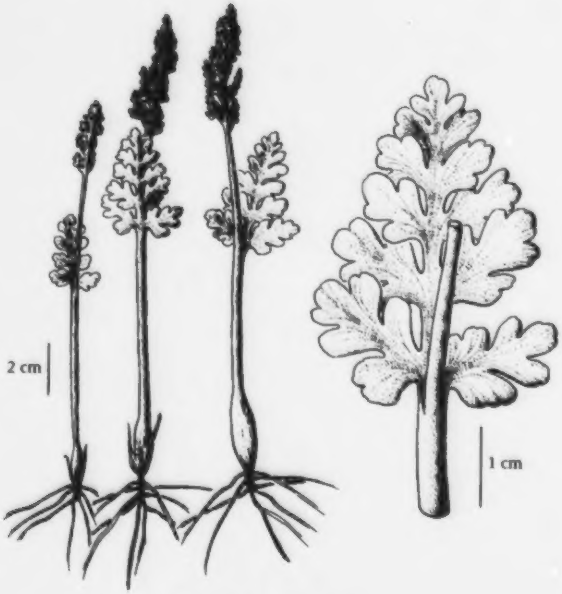
Notes: This species has been treated as a subspecies of *B. multifidum* but it seems to be more closely related to the amphiberingian *B. robustum* (Rupr.) Underw.



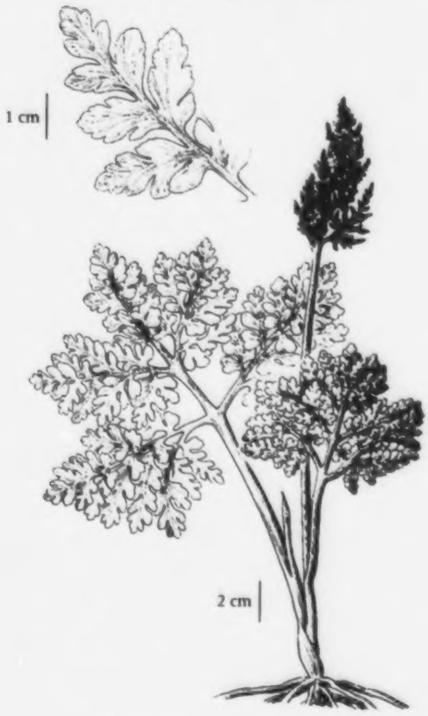
Botrychium paradoxum



Botrychium pedunculosum



Botrychium pinnatum



Botrychium silaifolium

***Botrychium simplex* E. Hitchc.**

least moonwort

HABITAT/RANGE:

Moist to wet vernal pools and ephemeral seepages in the lowland and montane zones; rare in S BC; circumpolar, E to SK, disjunct E to ON, PQ and NF and S to MA, NH, NC, MS, IA, SD, CO, UT, NV and CA; Eurasia.

DESCRIPTION:

General: Deciduous perennial, 0.5-7 cm tall.

Trophophores: Oblong to widely triangular, unstalked or narrowed into short stalks, usually simple; pinnae usually overlapping, up to 1.5 cm long, pinnules usually entire or shallowly lobed.

Sporophores: 1-pinnate, 1-8 times length of trophophores.

***Botrychium spathulatum* W.H. Wagner**

spoon-shaped moonwort

HABITAT/RANGE:

Dry to mesic sand dunes, old fields and grassy railroad sidings in the montane zone; rare in SE BC, known only from Kootenay National Park; N to AK, YT and NT, E to AB and S to MT, disjunct E to ON, PQ, NS and to MI and WI.

DESCRIPTION:

General: Deciduous perennial, 1-10 cm tall.

Trophophore: Oblong to lanceolate, unstalked, 1-pinnate, up to 8 cm long; pinnae to 8 pairs, well separated, narrowly spoon-shaped or spoon-shaped.

Sporophore: 1- to 2-pinnate, 1.2-2 times length of trophophores.

***Botrychium virginianum* (L.) Sw.** (*Botrypus virginianus* [L.] Michx.)

rattlesnake fern

HABITAT/RANGE:

Mesic to wet alluvial forests and swamps and river banks in the lowland, steppe and montane zones; frequent throughout BC; circumpolar, N to AK, YT and NT, E to NF and S throughout all of the U.S.; Eurasia.

DESCRIPTION:

General: Deciduous perennial, (5) 10-40 cm tall.

Trophophore: Triangular, unstalked, deciduous, thin, herbaceous, divided in 3's or 3- to 4-pinnate, up to 25-35 cm long and about as wide; pinnae to 12 pairs, approximate to overlapping; pinnules lanceolate with saw-toothed margins and pointed tips.

Sporophore: 2-pinnate, 0.5-1.5 times length of trophophores.

OPHIOGLOSSUM

***Ophioglossum pusillum* Raf.** (*O. vulgatum auct. non* L., *O. vulgatum* L. var. *pseudopodum* [Blake] Farw., *O. alaskanum* Britton)

northern adder's-tongue

HABITAT/RANGE:

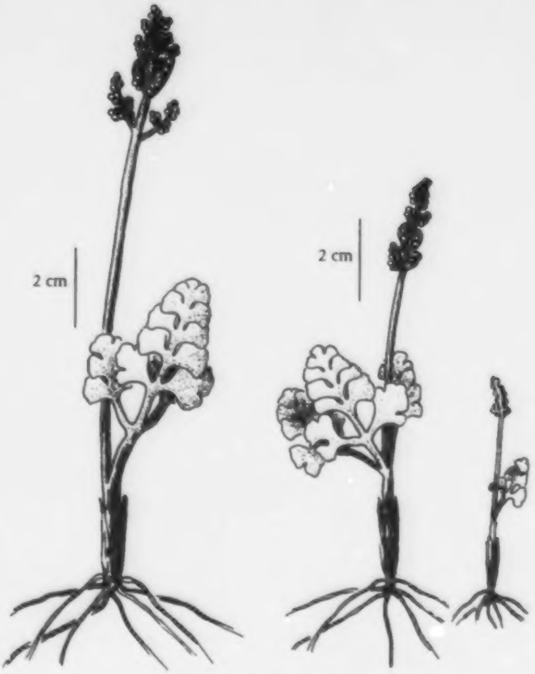
Periodically flooded wet meadows, vernal pools and lake margins in the lowland and montane zones; rare in S BC; N to AK, disjunct E to ON, PQ,NB and NS and S to MA, NH, PA, NC, IA, NE, MT and OR.

DESCRIPTION:

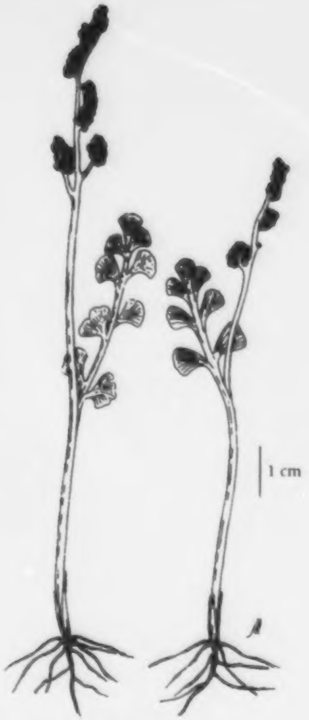
General: Deciduous perennial, 5-20 cm tall.

Trophophores: Lanceolate or egg-shaped, tapered to a stalk, simple, with entire margin.

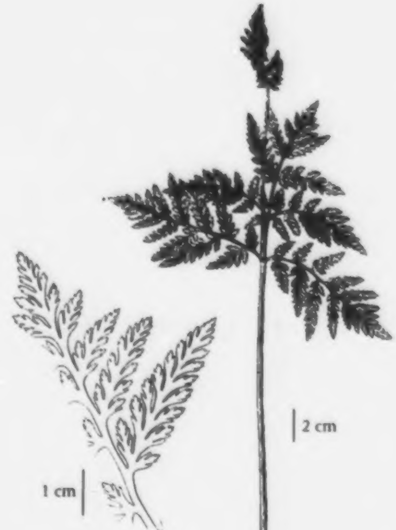
Sporophores: Arising at ground level, 2.5-4.5 times length of trophophores.



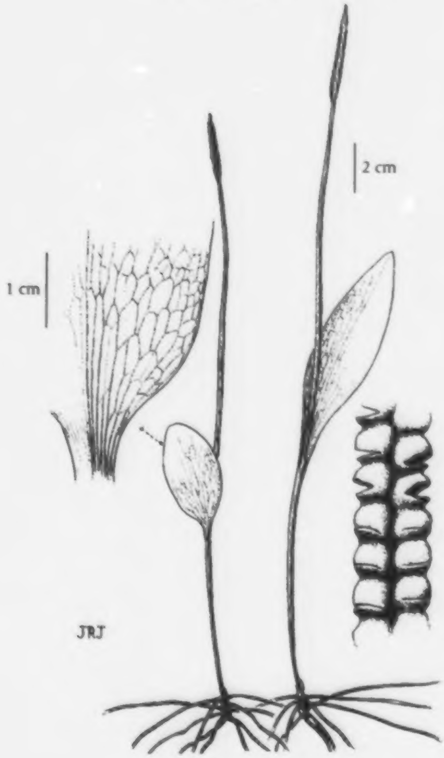
Botrychium simplex



Botrychium spathulatum



Botrychium virginianum



Ophioglossum pusillum

POLYPODIOPSIDA

ASPLENIACEAE

ASPLENIUM

1. Blades entire .... *A. scolopendrium*[16]
1. Blades pinnate.
    2. Stipes green or dark-green, deciduous; rachis green throughout .... *A. viride*
    2. Stipes purplish brown, persistent; rachis dark brown or purplish-brown at least in its lower part.
        3. Rachis brown or purplish-brown almost to the tip, wing-margined whitish papery lines (at 10x magnification) .... *A. trichomanes*
        3. Rachis brown or purplish-brown on the lower part, green on the upper third of the frond, lacking the whitish papery margins .... *A. adulterinum*

Asplenium adulterinum **Milde**
corrupt spleenwort
HABITAT/RANGE:

Dry to mesic walls of limestone fissures in the montane and subalpine zones; rare on Vancouver Island and in lower Fraser Valley; not known elsewhere in NA; Europe.

DESCRIPTION:

General: Evergreen from a short, stout rhizome, with clustered fronds.

Leaves: Narrowly lanceolate, 10-25 cm long, 0.7-1.5 cm wide; rachis not winged, reddish-brown in the lower 2/3-4/5, green towards the tip; pinnae in pairs, egg-shaped to oblong-egg-shaped, 5-10 mm long, 3-6 mm wide.

Sori: 1-3, narrow, 2-4 mm long; indusia linear, attached along their sides.

Notes: This species is an allotetraploid which originated from a hybrid of the diploid species *A. trichomanes* x *A. viride*. Mokry *et al.* (1986) ascribed our plants to *A. adulterinum* ssp. *presolanense*, described from the Italian Alps, but Vogel *et al.* (1998) consider them to be typical *A. adulterinum*.

Asplenium trichomanes **L.** (*A. melanocaulon* Willd.)
maidenhair spleenwort
HABITAT/RANGE:

Dry to mesic rocks in lowland and montane zones; frequent in coastal BC, infrequent east of the Coast-Cascade Mountains in S BC south of 51° N; circumpolar, N to S AK, E to AB and disjunct in ON to NF and S to GA, LA, TX, NM, AZ and CA; Eurasia.

DESCRIPTION:

General: Evergreen with clustered fronds.

Leaves: Narrowly lanceolate, 10-25 cm long, 0.7-1.5 cm wide; rachis winged with two wax-papery lines, reddish-brown throughout (except the green tip on youngest leaves); pinnae in pairs, egg-shaped to oblong egg-shaped, 5-15 mm long, 3-8 mm wide.

Sori: 1-3, narrow, 2-4 mm long; indusia linear, attached along their sides.

Notes: A variable species. Two chromosome races (diploid ssp. *trichomanes* and tetraploid ssp. *quadrivalens* D.E. Meyer) were reported from North America (Moran 1982, Wagner *et al.* 1993), but their distribution in British Columbia is poorly known and requires further study.

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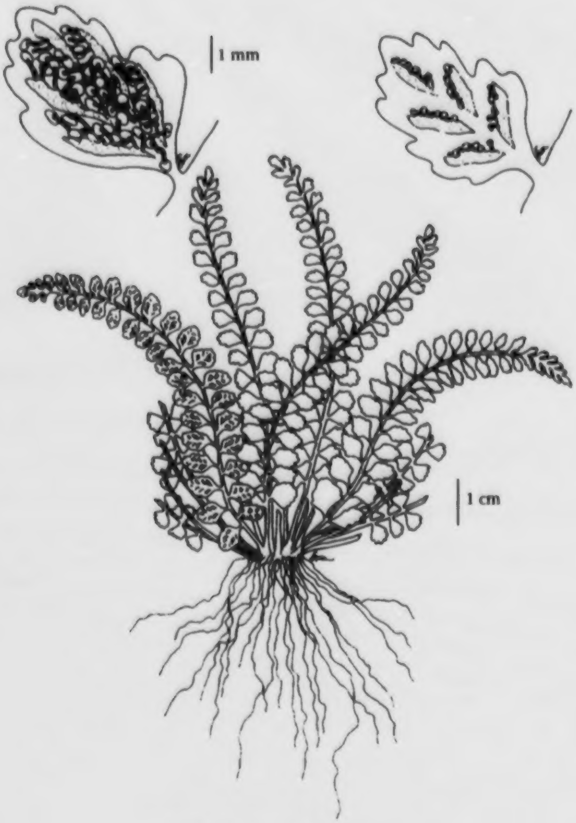
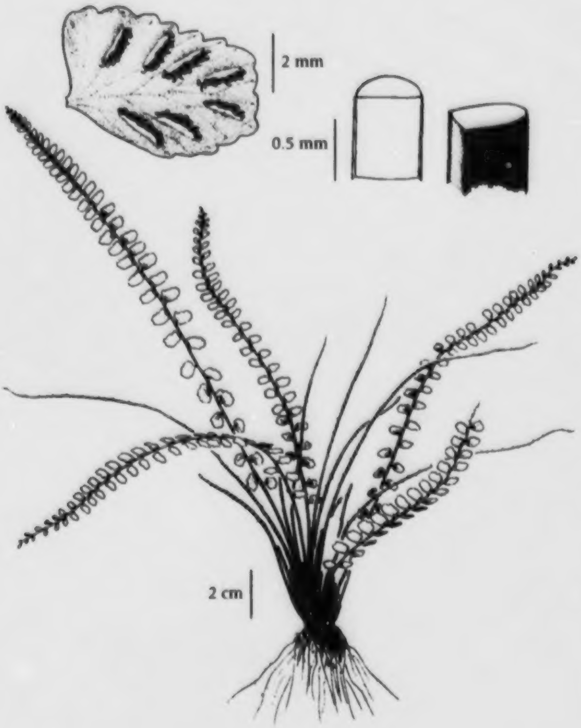
[16] Collected only once in British Columbia – see Excluded Species.



Asplenium adulterinum


2 mm
0.5 mm
2 cm

Asplenium trichomanes

Asplenium viride **Huds.** (*A. trichomanes-ramosum* L., *A. ramosum* L.)

green spleenwort

HABITAT/RANGE:

Mesic to moist crevices in limestone and other basic rocks from the lowland and steppe to subalpine zones; infrequent throughout BC; circumpolar, N to AK, YT and NT, E to AB and disjunct in ON to NF and S to VE, MI, WI, SD, MT, CO, UT, NV and OR; Eurasia.

DESCRIPTION:

General: Deciduous with clustered leaves.

Leaves: Narrowly lanceolate to lanceolate, 5-15 cm long, 0.5-1.2 cm wide; rachis not winged, green throughout; pinnae in pairs, egg-shaped to oblong, 3-7 mm long, 2-5 mm wide, with few notches towards the tip.

Sori: 1-2, narrow, 2-3 mm long; indusia linear, attached with their sides.

Notes: Some authors advocate the use of Linnaeus' name *A. trichomanes-ramosum*, which should be rejected as a trinomial. The International Code of Botanical Nomenclature (Tokyo Code) suggested use of the name "*A. ramosum* L." and at the same time, Zimmer & Greuter (1994) proposed to reject this name and retain *A. viride*.

AZOLLACEAE

AZOLLA[17]

1. Plants usually 0.5-1 cm long, dichotomously branched almost throughout; fronds not or scarcely overlapping like shingles, the upper lobes usually 0.5-0.6 mm long .... *A. caroliniana*

1. Plants usually more than 1 cm long, pinnately branched from a central axis, dichotomously branched only on the periphery of the plant; fronds slightly to greatly overlapping, the upper lobes usually at least 0.7 mm long.

   2. Plants 1-1.5 cm long; hairs on the upper surface of lobes often two-celled; hooked hairs of the microspore masses with many cross-walls; megaspores shallowly pitted in the basal region .... *A. mexicana*

   2. Plants 2-6 cm long; hairs on the upper surface of lobes 1-celled; hooked hairs of the microspore masses mostly without cross-walls (rarely with 1 or 2 cross-walls); megaspores net-veined in the basal region .... *A. filiculoides*

Azolla caroliniana **Willd.**

eastern mosquito fern

HABITAT/RANGE:

Surface of water, garden ponds, sloughs and ditches in the lowland zone; locally frequent in SW BC; introduced from E North America.

DESCRIPTION:

General: Delicate aquatic fern floating on water surface, plants usually 0.5-1 cm long, dichotomously branched almost throughout; fronds rather widely spaced.

Leaves: Scarcely overlapping, the upper lobes usually 0.5-0.6 mm long.

Sporocarps: Borne on floating lobes; hooked hairs without cross-walls; megaspores unknown.

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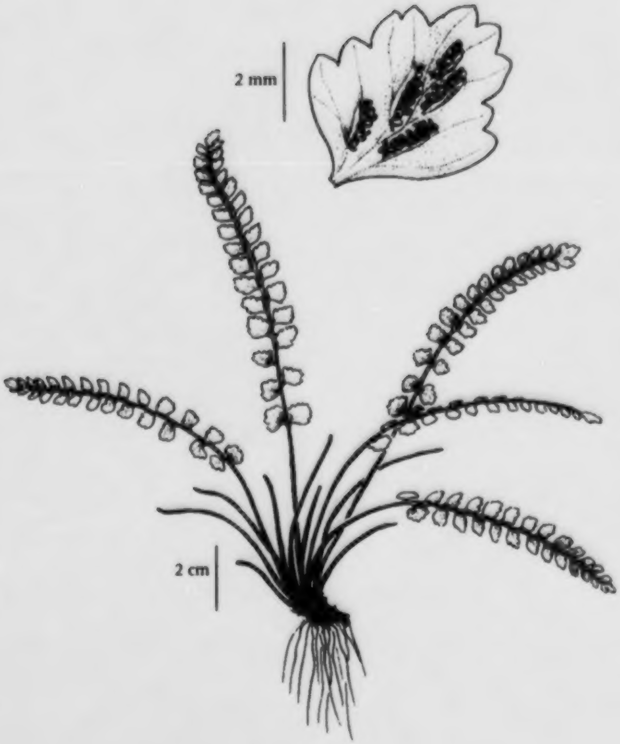
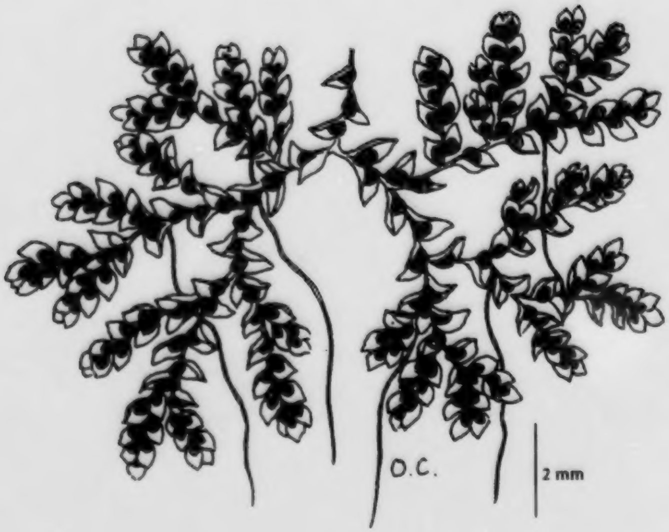
[17] Key adapted from Lellinger (1985).



Asplenium viride



Azolla caroliniana

Azolla filiculoides **Lam.**

large mosquito fern

HABITAT/RANGE:

Sloughs and ditches in the lowland zone; rare in SW BC, known from the lower Fraser River Valley; most probably introduced from E North America.

DESCRIPTION:

General: Delicate aquatic ferns floating on water surface; plants usually 2-6 cm long, pinnately branched from a central axis, dichotomously branched only at the periphery; fronds usually densely overlapping like shingles.

Leaves: The upper lobes 0.8-1 mm long.

Sporocarps: Borne on floating lobes; hooked hairs without cross-walls or rarely with 1 or 2 cross-walls; megaspores net-veined with raised hexagons at the base.

Azolla mexicana **K.B. Presl**

Mexican mosquito fern

HABITAT/RANGE:

Sloughs and pools in the montane zone; rare in SC BC, S to WI, IL, MO, TX, NM and CA.

DESCRIPTION:

General: Delicate aquatic ferns floating on water surface, plants usually 1-1.5 cm long, pinnately branched from a central axis, dichotomously branched only at the periphery of the plant; fronds overlapping like shingles, often densely so.

Leaves: The upper lobes usually 0.7-0.9 mm long.

Sporocarps: Borne on floating lobes; hooked hairs with many cross-walls; megaspores shallowly pitted at the base.

BLECHNACEAE

1. Fertile leaves strongly differentiated from sterile leaves; plants 10-60 cm tall .... *Blechnum*
1. Fertile leaves not differentiated from sterile leaves; plants robust, 60-160 cm tall .... *Woodwardia*

BLECHNUM

Blechnum spicant **(L.) Roth**

deer fern

HABITAT/RANGE:

Mesic to wet forests, peat bogs, streambanks and clearings in the lowland and montane zones; common in coastal BC, infrequent in SE BC; circumpolar, but widely disjunct, N to AK and S to ID and CA; N Africa, Eurasia.

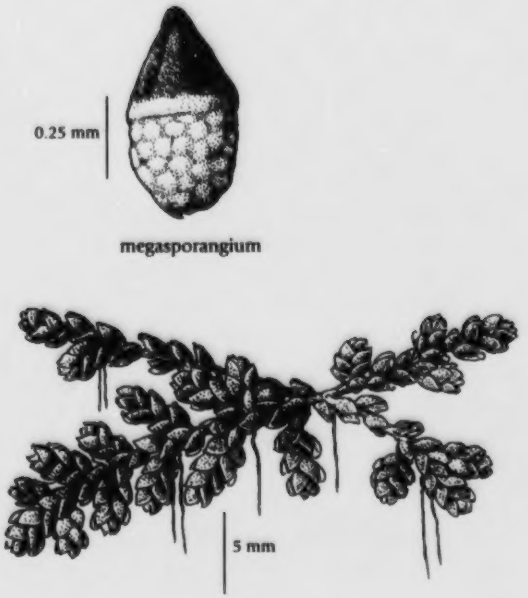
DESCRIPTION:

General: Tufted evergreen perennial from a short, thick rhizome.

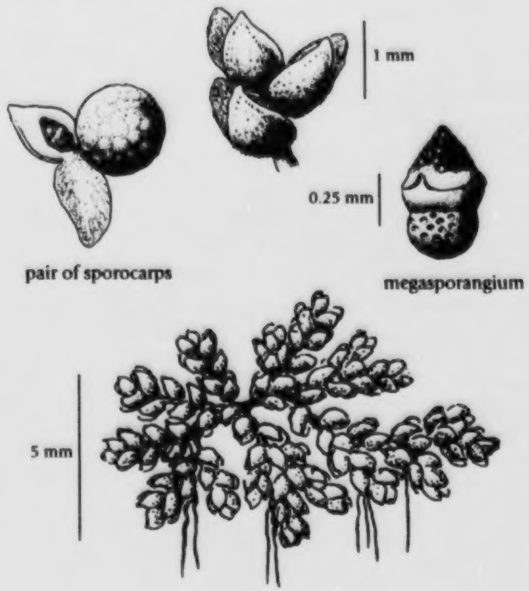
Leaves: Dimorphic; sterile leaves evergreen, spreading, lanceolate, 10-60 cm long, 2-10 cm wide, pinnately cleft (regularly deeply lobed); fertile leaves erect, narrowly lanceolate, 20-50 cm long, 1-pinnate with linear segments up to 7 cm long, 1-2 mm wide, withering soon after shedding spores.

Sori: Linear, continuous along both sides of midrib, 2-4 cm long, with oblong indusia.

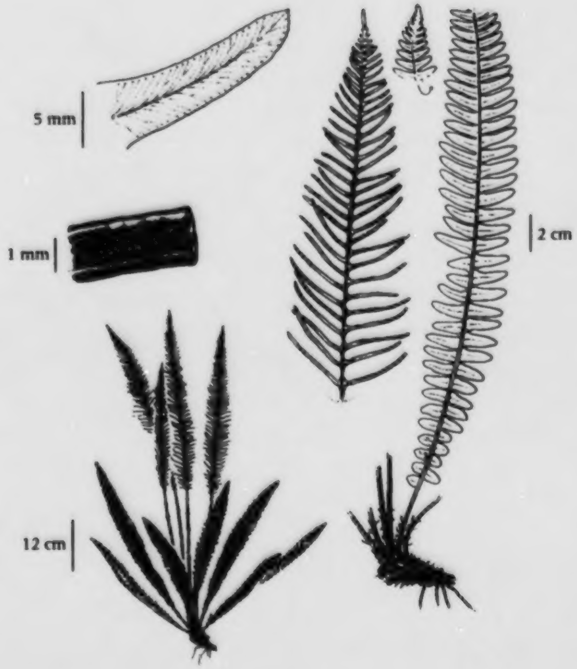
Notes: Our plants are generally more robust than their European counterpart and are referred by some authors (Löve & Löve 1966, 1968) to the amphiberingian ssp. *nipponicum* (Kunze) Löve & Löve.


0.25 mm
megasporangium
5 mm

Azolla filiculoides


1 mm
pair of sporocarps
0.25 mm
megasporangium
5 mm

Azolla mexicana


5 mm
1 mm
2 cm
12 cm

Blechnum spicant

WOODWARDIA

Woodwardia fimbriata **J.E. Smith ex Rees**

giant chain fern

HABITAT/RANGE:

Wet forests and seepy, coastal cliffs in the lowland zone; infrequent in SW BC (SE Vancouver Island, Lasqueti and Texada Islands); S to CA, disjunct to AZ and NV.

DESCRIPTION:

General: Evergreen perennial from a short, robust rhizome.

Leaves: Numerous, upright or slightly bent back, broadly lanceolate, 40-170 cm long, 30-70 cm wide, 1-pinnate, segments deeply cut into pointed teeth with margins having many tiny spines.

Sori: Linear, 5 mm long, arranged along the midveins of segments and their teeth; indusia leathery, persisting after sporangia shed the spores.

DENNSTAEDTIACEAE

PTERIDIUM

Pteridium aquilinum **(L.) Kuhn** (*P. aquilinum* var. *pubescens* Underw. & var. *lanuginosum* [Bong.] Fern. = ssp *lanuginosum*; *P. aquilinum* var. *latiusculum* [Desv.] Underw. = ssp. *latiusculum*)

bracken fern

HABITAT/RANGE:

Dry to wet forest margins, peat bogs, avalanche tracks, clearings, roadsides, burns, dry openings in forest and meadows, from the lowland and steppe to subalpine zones; common in BC south of 55° N (ssp. *lanuginosum*) or rare in the steppe zone S BC (ssp. *latiusculum*); cosmopolitan, E to W AB, disjunct to MB and ON, and S to GA, TX, NM, AZ and CA; Eurasia, Africa, Australia, S America.

DESCRIPTION:

General: Deciduous perennial from a long, creeping, underground rhizome.

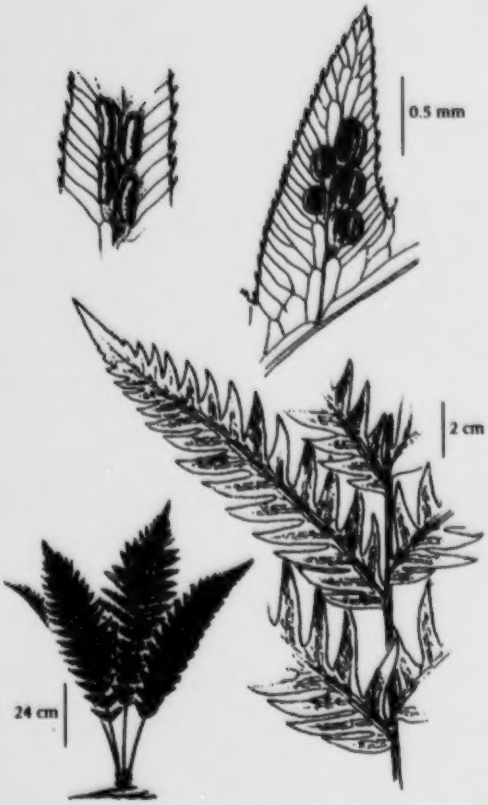
Leaves: Large, triangular, 3-pinnate, 60-170 cm long, 30-100 cm wide, with long, thick stipes, the ultimate segments numerous, woolly to smooth on the lower surface.

Sori: Linear along the marginal vein, covered both by inrolled leaf margins and by the hairy indusia.

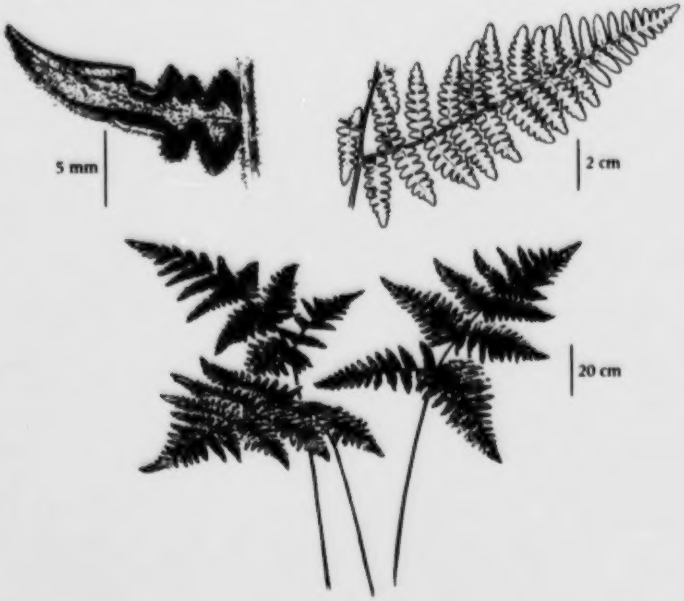
Notes: Most BC plants of this species belong to *P. aquilinum* ssp. *lanuginosum*. Two subspecies can be distinguished as follows:

1. Leaves broadly triangular, but rarely divided in 3 main segments; pinnules nearly at right angles to the rachis, their lower surface densely woolly or woolly short-hairy; the inner indusium fringed and sometimes also hairy .... ssp. *lanuginosum* (Bong.) Hult.

1. Leaves mostly with 3 main subdivisions; pinnules at an oblique angle to the rachis, their lower surface nearly smooth and short-hairy only on the midrib; the inner indusium without hairs .... ssp. *latiusculum* (Desv.) C.N. Page


0.5 mm
2 cm
24 cm

Woodwardia fimbriata


5 mm
2 cm
20 cm

Pteridium aquilinum ssp. *lanuginosum*

DRYOPTERIDACEAE

1. Leaves of two distinct forms, fertile and sterile fronds dissimilar .... *Matteucia*

1. Leaves all similar (or slightly diffentiated in *Dryopteris cristata*), fertile and sterile fronds look alike.

2. Indusia present, at least on young fertile fronds, sometimes only as filamentous segments.

3. Indusia splitting into filamentous or ribbon-like segments .... *Woodsia*

3. Indusia membranaceous or scale-like.

4. Indusia attached in the centre, margins of indusia free.

5. Pinnae margins thin and green; indusia laterally attached, kidney-shaped, with a deep sinus to the middle .... *Dryopteris*

5. Pinnae margins thick and pale; indusia centrally attached, shield-shaped, without a deep sinus .... *Polystichum*

4. Indusia attached along their margin, lanceolate or pouch-like.

6. Indusia lanceolate, attached along their margin; free margins of indusia entire .... *Athyrium*

6. Indusia egg-shaped, pouch-like; free margins of indusia saw-toothed .... *Cystopteris*

2. Indusia absent.

7. Leaves tufted on a short rhizome that is covered by the conspicuous, persistent, densely clustered stipe-bases of previous years.

8. Sori elongate; leaves relatively large, 2-8 dm long, forming a vase-like tuft; persistent stipe-bases appressed, coarse, flattened, 3 mm wide .... *Athyrium*

8. Sori round; leaves smaller, 0.5-3.5 dm long, not forming a vase-like tuft; persistent stipe bases free-standing, more slender and wiry, not more than 2 mm wide .... *Woodsia*

7. Leaves scattered or in small tufts, not accompanied by conspicuous, persistent stipe-bases of previous years.

9. Pinnae alternate; leaves lanceolate or triangular-lanceolate in outline, longer than broad .... *Cystopteris*

9. Pinnae opposite; leaves triangular in outline, about as long as broad .... *Gymnocarpium*

ATHYRIUM

1. Indusia crescent-shaped, persistent; fronds well-expanded, flat; pinnae not appearing crowded or directed sharply towards the tips of the frond .... *A. filix-femina*

1. Indusia inconspicuous, withering early; fronds obliquely folded; pinnae crowded and directed sharply towards the tips of the frond .... *A. distentifolium*

Athyrium distentifolium **Tausch *ex* Opiz ssp. *americanum* (Butters) Hult.** (*A. alpestre* [Hoppe] Opiz *non* Clairv., *A. distentifolium* var. *americanum* [Butters] Boivin, *A. americanum* [Butters] Maxon)

alpine lady fern

HABITAT/RANGE:

Dry to moist talus slopes, rocks and rocky meadows in the subalpine and alpine zones; infrequent in S BC, rare northward; N to AK, YT and NT, disjunct in PQ and NF and S to CO, UT, NE and CA.

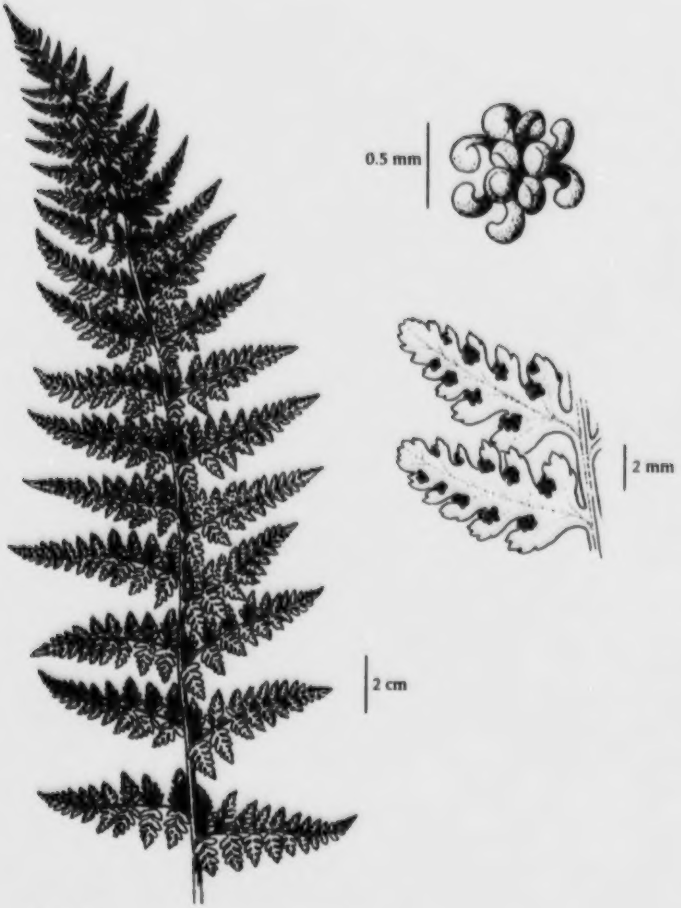
DESCRIPTION:

General: Deciduous perennial arising from a short, stout rhizome.

Leaves: Numerous, upright, narrowly elliptic or lanceolate, 20-70 cm long, 5-25 cm wide, 3-pinnate, ultimate segments oblong, minutely round-toothed.

Sori: Round to oblong; indusia absent.

Notes: Fuchs (1974) showed that the name, *Athyrium alpestre* (Hoppe) Ryland is a later homonym of *A. alpestre* Clairv. and must be rejected.


0.5 mm
2 mm
2 cm

Athyrium distentifolium* ssp. *americanum

Athyrium filix-femina **(L.) Roth ssp.** ***cyclosorum*** **(Rupr.) C. Christ.** (*Athyrium cyclosorum* Rupr., *A. filix-femina* var. *sitchense* Rupr., var. *californicum* Butters)
lady fern

HABITAT/RANGE:

Mesic to wet alluvial forests, glades, streambanks, gullies, slidetracks, meadows, swamps and rock outcrops from the lowland and steppe to alpine zones; common throughout BC; amphiberingian, N to AK, YT and NT, E to NF and S to SD, NM, AZ and CA; E Asia.

DESCRIPTION:

General: Deciduous perennial arising from a short, stout rhizome.

Leaves: Numerous, in vase-like tufts, 30-180 cm long, 10-70 cm wide, broadly lanceolate, broadest in the middle and gradually narrowed both to the base and to the top, 2-pinnate with pinnae divided into numerous ultimate segments.

Sori: Oblong to lanceolate; with crescent-shaped, scale-like indusia.

CYSTOPTERIS

1. Rhizomes short; fronds forming clumps; stipes shorter than the leaf blade; leaf blades lanceolate or egg-shaped, about 2-3 times longer than wide .... *C. fragilis*

1. Rhizomes long-creeping; fronds arising singly at the end of the rhizome; stipes longer than the leaf blade; leaf blades triangular, about as long as wide .... *C. montana*

Cystopteris fragilis **(L.) Bernh.** (*C. dickieana* R. Sim)
fragile fern

HABITAT/RANGE:

Dry to moist rocks, talus slopes, crevices, ledges, and forest margins from the lowland and steppe to alpine zones; common throughout BC; cosmopolitan, N to AK, YT and NT, E to NF, and S to ME, NH, PA, NC, IL, KS, NM, AZ and CA; Eurasia, Africa, New Zealand, Australia, S America, Antarctic Islands.

DESCRIPTION:

General: Deciduous perennial arising in clusters from a short, creeping rhizome.

Leaves: Thin, broadly lanceolate or egg-shaped, 5-45 cm long, 3-10 cm wide, smooth, seldom finely glandular, 2- to 3-pinnate, ultimate segments fan-like, toothed towards the tips.

Sori: Rounded, in a cup-like indusia.

Notes: A variable species, which in this concept includes both plants with spiny spores (*C. fragilis sensu stricto*) and those with warty spores. Plants with warty spores were segregated in Europe as *C. dickieana*. Ceska & Ceska (unpubl.) found that our populations with warty spores are not uniform in other characters and agree with C. Haufler that "some of the American material ... may not be conspecific with material from the type locality of *C. dickieana*." (Lellinger 1985, p. 260).

Cystopteris montana **(Lam.) Bernh.** (*Rhizomatopteris montana* [Lam.] Khokhr.)
mountain bladder fern

HABITAT/RANGE:

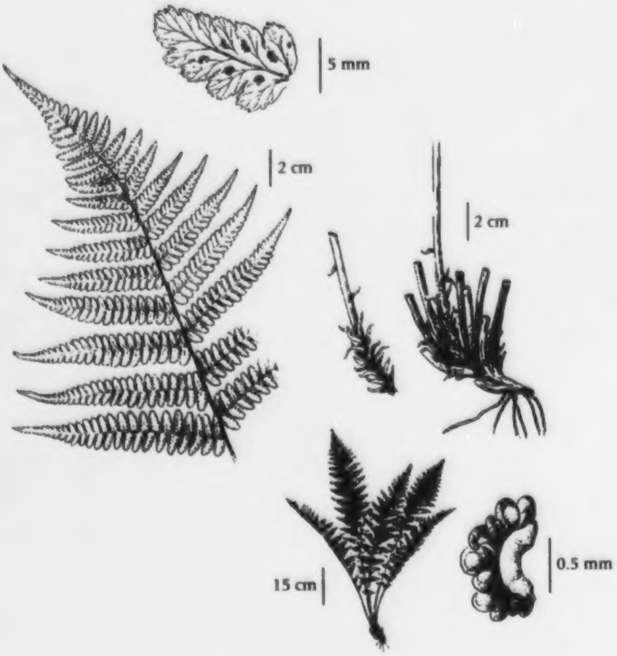
Moist to wet calcareous scree slopes, rock outcrops and damp woods in the montane and subalpine zone; rare in N BC north of 54° N and in the Rocky Mountains; circumpolar, N to AK, YT and NT, E to AB, disjunct in ON, PQ and NF and disjunct S to CO; Eurasia.

DESCRIPTION:

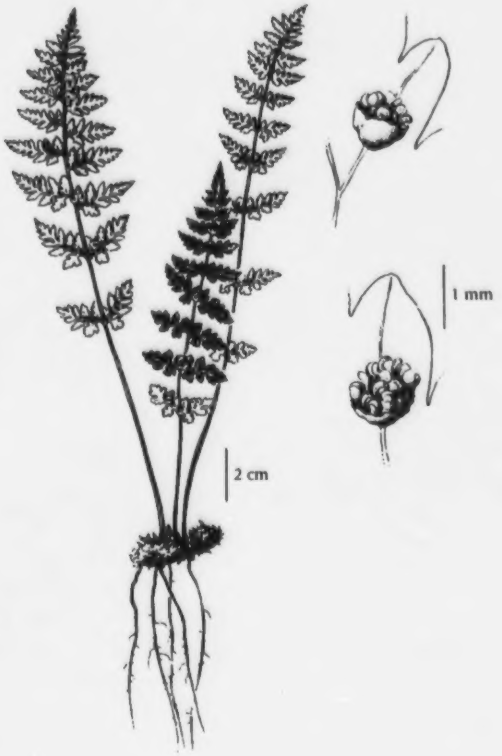
General: Deciduous perennial arising singly from a thin, long-creeping rhizome.

Leaves: Thin, broadly triangular, on long stipes, blades triangular, 5-15 cm long, about 5-15 cm wide, 3-4 ternate-pinnate, with oblong-lanceolate ultimate segments.

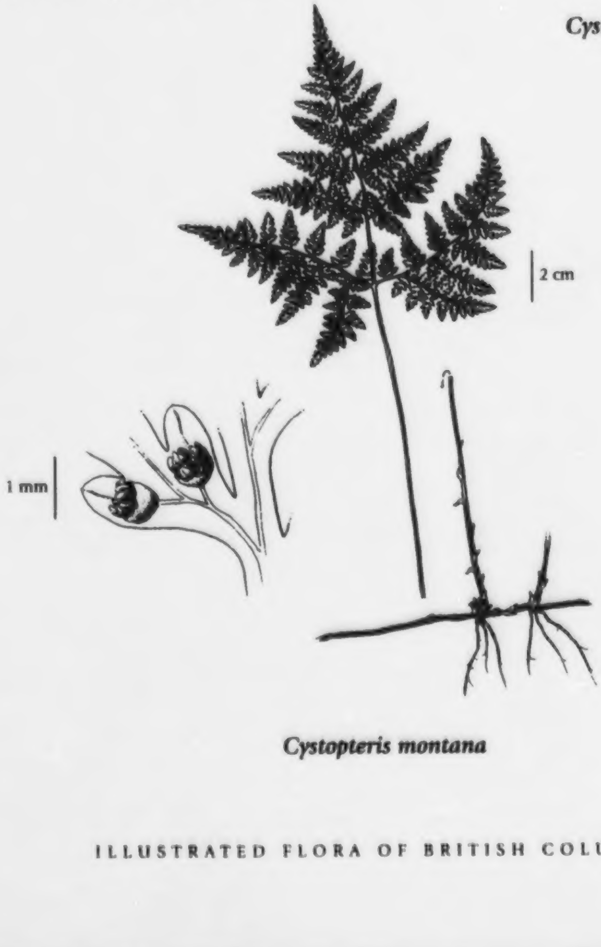
Sori: Rounded in a cup-like indusium.


5 mm
2 cm
2 cm
15 cm
0.5 mm

Athyrium filix-femina ssp. *cyclosorum*



Cystopteris fragilis



Cystopteris montana

DRYOPTERIS

1. Blades densely covered by stalked glands; indusia with glandular margins; plants aromatic ..... *D. fragrans*
1. Blades and indusia without glands; plants not aromatic.
    2. Fronds of two distinct forms, fertile fronds taller and narrower than the sterile ones; lowermost pinnae markedly shorter than pinnae in the middle of the blade; segments of the lower pinnae rounded in outline, broadly attached and scarcely or not at all contracted at the base .... *D. cristata*
    2. Fronds all alike; lowermost pinnae only slightly shorter than those in the middle of the blade; segments of the lower pinnae oblong in outline, narrowly attached to the midrib and contracted at the base.
        3. Sori located close to the leaf margin; tip of pinnules minutely round-toothed or entire ..... *D. marginalis*
        3. Sori located between the leaf margin and the midrib, never directly at the leaf margin; tip of pinnules finely scalloped or toothed.
            4. Leaves pinnate with pinnae divided again once or twice into pinnules; leaf blades not narrowed towards their base.
                5. Leaf blades triangular in outline, broadest at the base, lines connecting tips of the lower pinnae clearly divergent; basal pinnules of the lowest pinna alternate, those pointing down more than twice as long as the pinnules pointing up; rachis at the base of lowest pinnae and the veins of the lowest with sparse glandular hairs .... *D. expansa*
                5. Leaf blades elongate-triangular in the outline, lines connecting tips of lower pinnae almost parallel; basal pinnules of the lowest pinna approximate and almost opposite, those pointing down less than twice as long as the pinnule pointing up; rachis and the pinnae without glandular hairs .... *D. carthusiana*
            4. Leaves pinnate with pinnae incised to sometimes further divided; leaf blades narrowed towards their base.
                6. Ultimate segments finely spiny with spreading teeth; pinnae unstalked .... *D. arguta*
                6. Ultimate segments with blunt teeth; pinnae clearly stalked .... *D. filix-mas*

Dryopteris arguta **(Kaulf.) Watt**
coastal wood fern

HABITAT/RANGE:

Mesic forest margins and rocky sea cliffs in the lowland zone; rare in SW BC; S to CA, disjunct in AZ.

DESCRIPTION:

General: Perennial in vase-like clusters from a stout, creeping rhizome.

Leaves: Overwintering, oblong-lanceolate, broadest in the middle and narrowed towards the top and less towards the bottom, 20-60 cm long, 5-25 cm wide, 1-pinnate, the pinnae deeply cut; segments with small, spiny teeth along the margin.

Sori: Midway between midvein and the margin, round; indusia kidney-shaped, lacking glands.

Dryopteris carthusiana **(Vil.) H.P. Fuchs** (*D. spinulosa* [O.F. Muell.] Watt, *D. austriaca auct. non* [Jacq.] Woynar, *D. dilatata auct. non* Hoffm.)
toothed wood fern

HABITAT/RANGE:

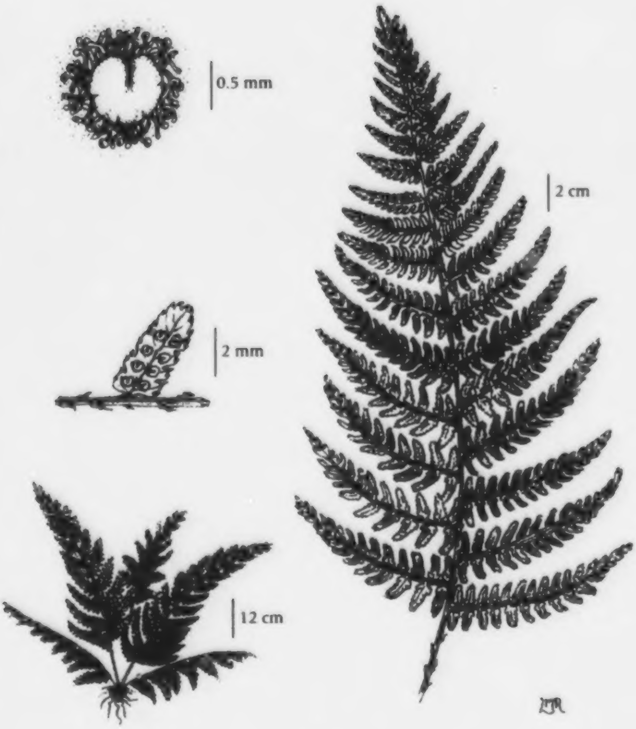
Wet forests, swamps and avalanche tracks in the lowland, steppe and montane zones; infrequent throughout BC; circumpolar, N to YT and NT, E to NF and S to MA, NH, SC, AL, AR, NE, MT, ID and OR; Eurasia.

DESCRIPTION:

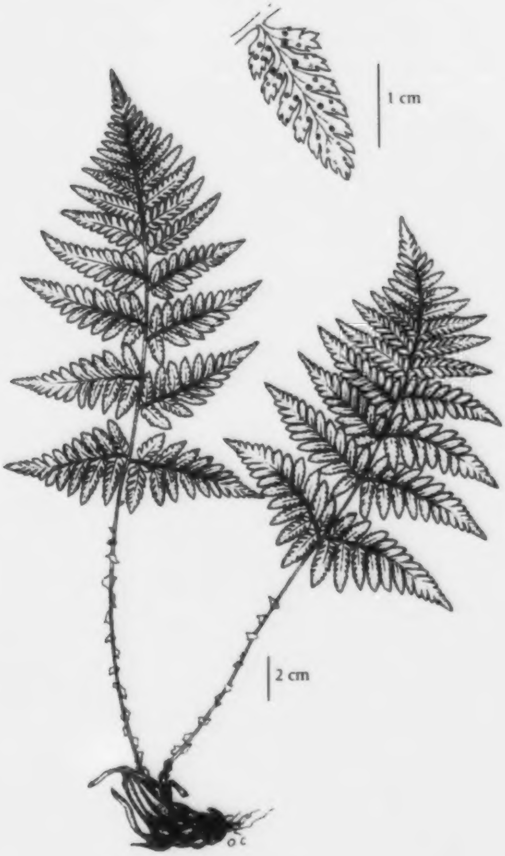
General: Deciduous perennial arising in a vase-like cluster.

Leaves: Oblong, 20-70 cm long, 5-30 cm wide, smooth, 2-3 pinnate, the lowermost pinnae about the same length as those next to them higher up on the frond, leaf outline with parallel sides in its lower half.

Sori: Midway between the midvein and the margin; indusia kidney-shaped, lacking glands.


0.5 mm
2 cm
2 mm
12 cm

Dryopteris arguta



Dryopteris carthusiana

Dryopteris cristata **(L.) A. Gray**
crested wood fern
HABITAT/RANGE:

Wet swamps and meadows in the steppe and montane zones; rare in WC and S BC; circumpolar, E to NF and S to MA, NC, NC, GA, AL, MO, ND, MT, ID and WA; Europe; W Asia.

DESCRIPTION:

General: Evergreen perennial arising in small clusters from a short, stout rhizome.

Leaves: Dimorphic; sterile leaves leathery, narrowly oblong, 20-75 cm long, 5-15 cm wide, 1-pinnate, the pinnae deeply cut, the margins toothed; fertile leaves withering after the spores are shed, irregularly 1-pinnate, the pinnae triangular, irregularly incised.

Sori: Midway between the midvein and the margin; indusia kidney-shaped, lacking glands.

Dryopteris expansa **(K.B. Presl) Fraser-Jenkins & Jermy** (*D. assimilis* S. Walker, *D. spinulosa* [Sw.] Watt ssp. *assimilis* [Walker] Schidlay, *D. austriaca auct. non* [Jacq.] Woynar, *D. dilatata auct. non* Hoffm.)
spiny wood fern; spreading wood fern
HABITAT/RANGE:

Mesic to wet forests, forest margins and scree slopes from the lowland and steppe to subalpine zones; common in BC; circumpolar, N to AK, YT and NT, E to NF, S to MI, WI, MN, CO, ID and CA; Eurasia.

DESCRIPTION:

General: Deciduous perennial arising in vase-like clusters or singly.

Leaves: Triangular to oblong-triangular, 20-70 cm long, 10-60 cm wide, sparsely glandular on rachis and lower side of pinnae, 2- to 3-pinnate, the lowest pinnae longer than the upper ones, leaf outlines triangular.

Sori: Midway between the midvein and the margin; indusia kidney-shaped, lacking glands or sparsely glandular.

Dryopteris filix-mas **(L.) Schott**
male fern
HABITAT/RANGE:

Mesic to moist alluvial forests, avalanche tracks, talus and rocky crevices in the lowland to subalpine zones; frequent in coastal BC except rare on Vancouver Island and the Queen Charlotte Islands, infrequent in SC BC; almost cosmopolitan, but widely disjunct, E to NF and S to MA, NH, NY, MI, IL, TX, NM, AZ and CA; Eurasia, S America, S Asia, S Africa.

DESCRIPTION:

General: Deciduous perennial in vase-like clusters from a short, stout rhizome.

Leaves: Oblong-lanceolate, broadest in the middle and narrowed towards the top and less towards the bottom, 20-120 cm long, 5-35 cm wide, 1-pinnate, the pinnae deeply cut, the segments with small blunt teeth along the margins.

Sori: Midway between the midvein and the margin, round; indusia kidney-shaped, lacking glands.

Dryopteris fragrans **(L.) Schott** (*D. fragrans* var. *remotiuscula* Komarov)
fragrant wood fern
HABITAT/RANGE:

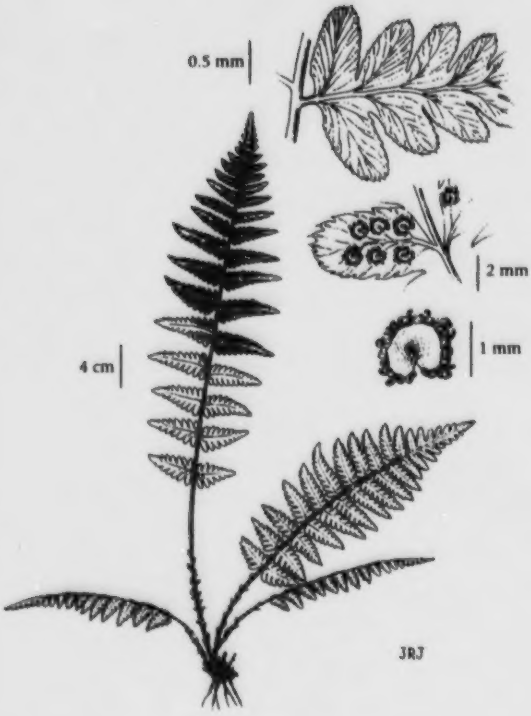
Dry rocks and talus in the lowland to subalpine zones; infrequent in N BC; circumpolar, N to AK, YT and NT, E to NF and S to MA, NY, MI, WI and MN; N Asia, N Scandinavia.

DESCRIPTION:

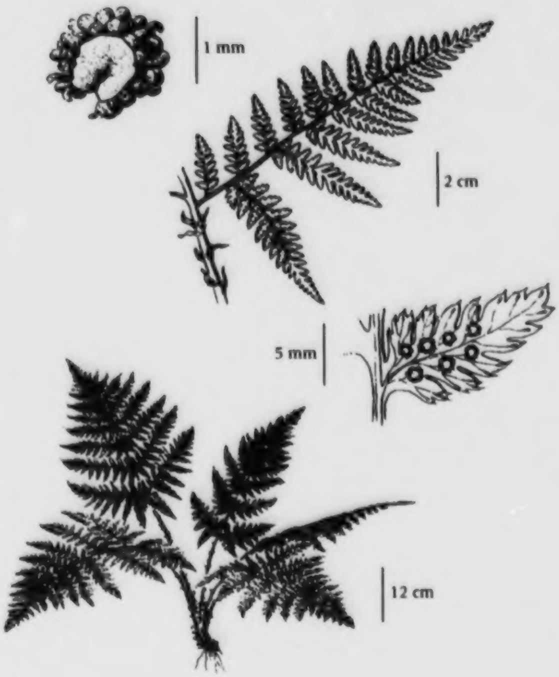
General: Evergreen perennial in dense clusters arising from a short rhizome.

Leaves: Oblong-lanceolate, 5-35 cm long, 3-7 cm wide, 2-pinnate, the pinnae with dense scales on the upper surface, glandular and aromatic.

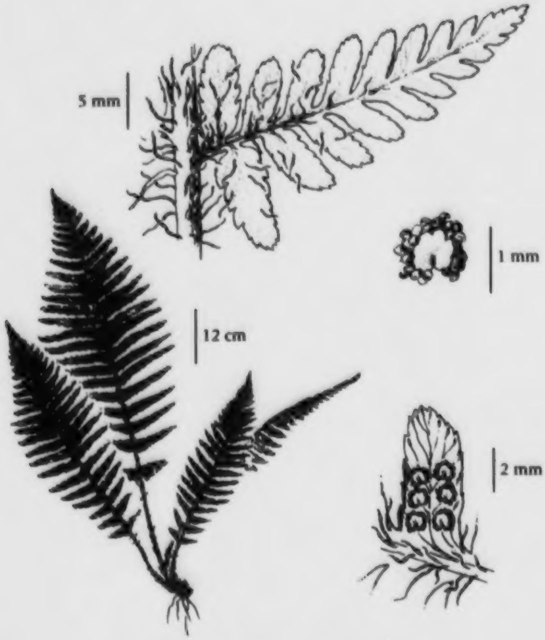
Sori: Midway between the midvein and the margin; indusia kidney-shaped, glandular.


0.5 mm
2 mm
1 mm
4 cm
JRJ

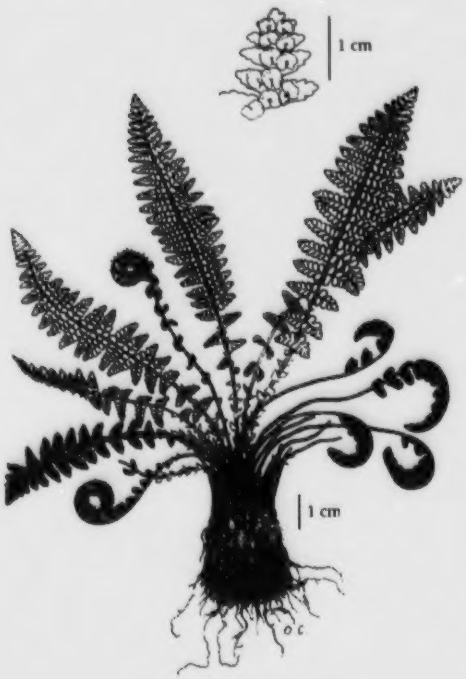
Dryopteris cristata


1 mm
2 cm
5 mm
12 cm

Dryopteris expansa


5 mm
1 mm
12 cm
2 mm

Dryopteris filix-mas



Dryopteris fragrans

Dryopteris marginalis **(L.) A. Gray**

marginal wood fern

Habitat/Range:

Moist woods in the montane zone; rare in SW BC, known only from Meager Creek Hot Springs; disjunct from ON to NF and S to ME, PA, NC, GA, AL, MS, AR and OK.

Description:

General: Evergreen perennial arising in vase-like clusters from a short, stout rhizome.

Leaves: Oblong-lanceolate, broadest in the middle and narrowed towards the bases and towards the tips, 1-pinnate, the pinnae deeply cut, the ultimate segments with small rounded teeth or entire.

Sori: Near margin of segments; indusia kidney-shaped, lacking glands.

GYMNOCARPIUM

1. Rachis with glands, especially conspicuous at the base of the pinnae; lower leaf blade surface glandular .... *G. jessoense*

1. Rachis without glands; upper and lower leaf blade surfaces smooth.

    2. Leaves divided only once into three pinnae .... *G. dryopteris*

    2. Leaves divided twice, each of the three pinnae divided again into three pinnules .... *G. disjunctum*

Gymnocarpium disjunctum **(Rupr.) Ching** (*G. dryopteris* ssp. *disjunctum* [Rupr.] Sarvela, *Dryopteris disjuncta* [Rupr Morton)

western oak fern

Habitat/Range:

Moist forests, glades, rocky slopes, streambanks from the lowland to subalpine zones; common throughout all but NE BC; amphiberingian, N to AK, E to AB and S to WY, MT, OR and WA; Kamchatka, Sakhalin.

Description:

General: Deciduous perennial arising individually at spaced intervals from long creeping rhizomes and usually in large colonies.

Leaves: On wiry, smooth or sparingly glandular stipes, 10-40 cm long, blades triangular, 10-35 cm long and about the same width, 3-pinnate; ultimate segments lobed.

Sori: Rounded, aggregated in a line near the segment margins; indusia lacking.

Gymnocarpium dryopteris **(L.) Newman** (*Phegopteris dryopteris* [L.] Feé, *Thelypteris dryopteris* [L.] Slosson)

oak fern

Habitat/Range:

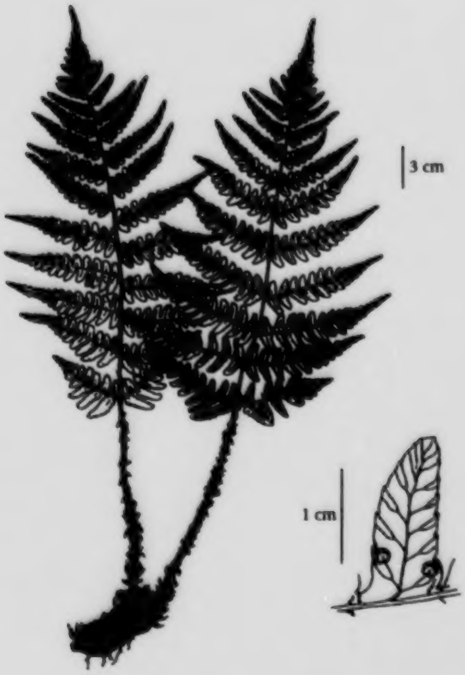
Moist to wet rocky forests, bog margins, and rocky ledges in the montane and subalpine zones; infrequent east of the Coast-Cascade Mountains; circumpolar, N to AK, YT and NT, E to NF and S to PA and MI; Eurasia.

Description:

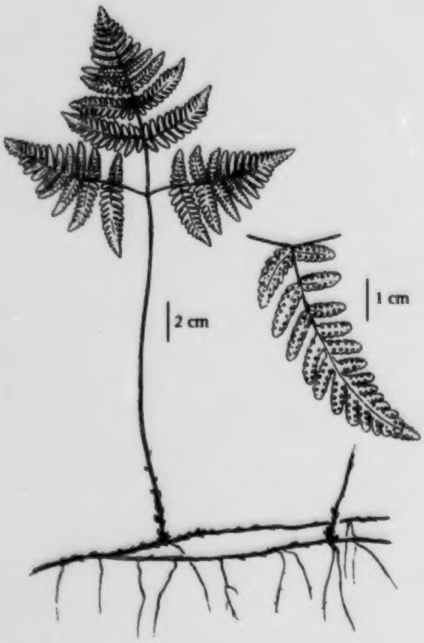
General: Deciduous perennial arising individually at spaced intervals from long creeping rhizomes and usually in large colonies.

Leaves: On wiry, smooth stipes 5-25 cm long, blades triangular, 5-15 cm long and about the same width, 2-pinnate; ultimate segments lobed.

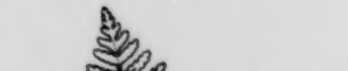
Sori: Rounded, aggregated in a line near the segment margins; indusia lacking.



Dryopteris marginalis



Gymnocarpium disjunctum



Gymnocarpium dryopteris

Gymnocarpium jessoense **(Koidz.) Koidz. ssp. *parvulum* Sarvela** (*G. continentale* [V. Petrov] Pojark., *G. robertian auct. non* [Hoffm.] Newm.)

Nahanni oak fern

HABITAT/RANGE:

Moist cool shale or limestone slopes in the montane and subalpine zones; rare in NE BC; amphiberingian, N to AK, YT, and NT, E to ON and S to WI and MN; Asia.

DESCRIPTION:

General: Deciduous perennial arising individually at spaced intervals from long creeping rhizomes and usually in large colonies.

Leaves: On wiry stipes 5-25 cm long, with abundant glandular hairs near the attachment of pinnae, blades triangular 5-15 cm long and about the same width, 2-pinnate; ultimate segments lobed, with glands on the lower surface.

Sori: Rounded, aggregated in a line near the segment margins; indusia lacking.

Notes: A hybrid with *G. dryopteris*, x *G. intermedium* Sarvela, has not been reported from BC, but can be expected in NE BC.

MATTEUCIA

Matteucia struthiopteris **(L.) Tod.**

ostrich fern

HABITAT/RANGE:

Moist to wet sandy or silty banks of rivers and streams and alluvial forests in the lowland and montane zones; infrequent, but locally abundant throughout BC, absent on the Queen Charlotte Islands and Vancouver Island; circumpolar, N to AK, YT and NT, E to NF and S to MA, VA, OH, IN, MO and SD; Eurasia.

DESCRIPTION:

General: Large perennial with leaves of two forms, sterile leaves deciduous, fertile leaves overwintering.

Leaves: Sterile leaves in vase-like clusters, 30-140 cm long, 12-30 cm wide, light green, oblanceolate, broadest in the upper 1/4, 1-pinnate, pinnae deeply cut in 30-80 segments; fertile leaves stiff, narrowly lanceolate, dark brown, about 60 cm long, 5-10 cm wide, with linear, obtuse pinnae.

Sori: Round, 1 or 2 at base of each lobe, covered by inrolled leaves; indusia soon deciduous.

POLYSTICHUM[18]

1. Fronds 1-pinnate, the pinnae not deeply cleft again, with only shallow teeth along the margin.
    2. Lowest pinnae triangular or subtriangular to broadly trowel-shaped, symmetrical; all pinnae with small spreading teeth; stipe length less than one tenth of the frond; spores spiny .... *P. lonchitis*
    2. Lowest pinnae egg-shaped to sickle-shaped, asymmetrical; pinnae with small incurved spiny teeth; stipe length more than one tenth of the frond; spores with folded or bumpy surface, without spines.
        3. Pinnae arranged in the plane of the frond, distant; stipe and rachis persistently chaffy with scales more than 1 mm wide; indusia fringed with hairs; pinnae wedge-shaped at the base .... *P. munitum*
        3. Pinnae folded inwards and oriented about 45° to the plane of the frond, overlapping like shingles; stipe and rachis often naked; scales less than 1 mm wide; indusia entire; pinnae oblique at the base .... *P. imbricans*
1. Fronds 1- to 2-pinnate, the pinnae deeply lobed, incised, or again pinnate.
    4. Pinnae teeth without short spines or awns .... *P. lemmonii*
    4. Pinnae teeth with short spines or awns.
        5. Fronds clearly 2-pinnate, the pinnules distinct, unstalked or stalked.

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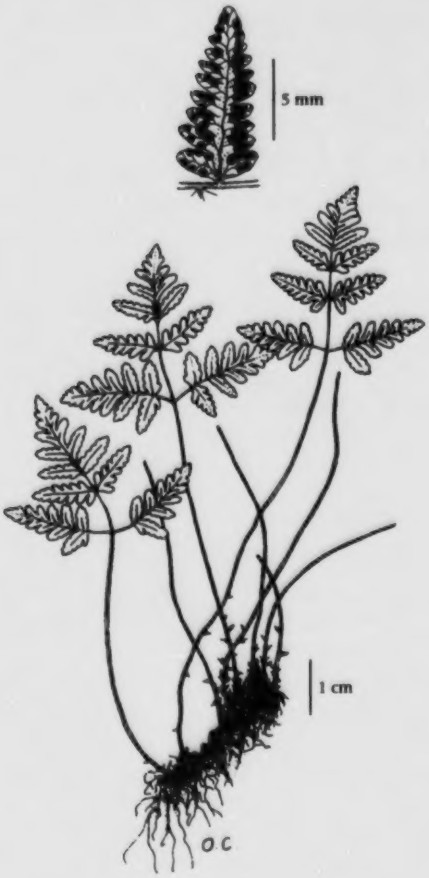
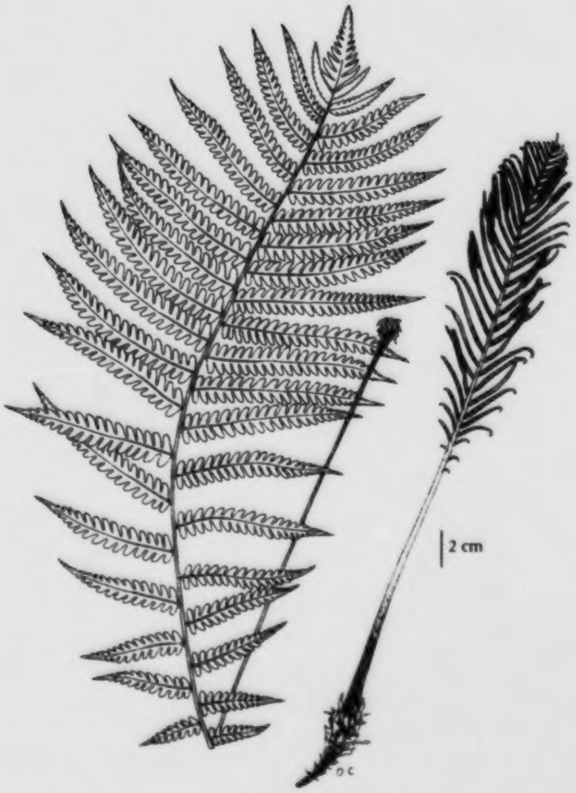
[18] Key adapted from Wagner (1979).



Gymnocarpium jessoense ssp. *parvulum*



Matteucia struthiopteris

6. Fronds with vegetative buds on the rachis; indusia entire .... *P. kwakiutlii*[19]

6. Fronds without vegetative buds on the rachis; indusia sparsely fringed on the margins.

    7. Pinnules at the base of the pinnae of unequal length, those pointing up conspicuously larger than those pointing down .... *P. setigerum*

    7. Pinnules at the base of the pinnae about the same length .... *P. braunii*

5. Fronds bipinnatifid, 1-pinnate, the pinnae deeply lobed or incised, the pinnules attached to the midrib for more than 2 mm, usually with fused bases.

8. Pinnae lacking thread-like scales on either surface.

    9. Pinnae abruptly pointed at the tips, especially at the base of the blade, armed with coarse (visible without magnification) spreading teeth; stipe shorter than 1/4 of the frond .... *P. kruckebergii*

    9. Pinnae obtuse at tips, especially at the base of the blade, armed with fine, incurved teeth; stipe at least 1/4 of the frond length .... *P. scopulinum*

8. Pinnae with thread-like scales beneath.

    10. Fronds with a vegetative bud on the rachis, usually 1/3 of the way down from the tip.

        11. Indusia sparsely fringed on the margin; hairs on leaf surface with contorted projections .... *P. andersonii*

        11. Indusia entire; hairs on leaf surface simple .... *P. kwakiutlii*[19]

    10. Fronds without a vegetative bud.

        12. Pinnae not incised to the midrib, the pinnules fused at least 1/4 their length .... *P. californicum*[19]

        12. Pinnae incised to the midrib, the pinnules scarcely fused .... *P. setigerum*

***Polystichum andersonii* Hopkins (*P. braunii* ssp. *andersonii* [Hopkins] Calder & Taylor)**

Anderson's holly fern

HABITAT/RANGE:

Mesic to moist coniferous forests, lava flows and talus scree in the lowland to subalpine zones; frequent in coastal NW BC, infrequent elsewhere; N to AK and S to MT, ID and OR.

DESCRIPTION:

General: Perennial with deciduous or overwintering leaves arising from a short stout rhizome.

Leaves: Broadly lanceolate, 30-100 cm long, 5-30 cm wide, 1-pinnate, with one or several bulbils at the base of upper pinnae; pinnae deeply cut, but their segments attached to the body of the pinnae with a broad base, minutely sawtoothed-spiny with teeth ascending.

Sori: Rounded, attached close to the midvein; indusia round, sparsely fringed.

***Polystichum braunii* (Spenner) Fée (*P. braunii* ssp. *purshii* [Fernald] Calder & Taylor)**

Braun's holly fern

HABITAT/RANGE:

Mesic to wet alluvial forests, coniferous forests, talus and lava flows in the lowland to subalpine zones; infrequent in BC; circumpolar, N to AK and S to ID, disjunct E to ON,PQ, NS and NF and S to MA, PA, MI, WI and MN; Eurasia.

DESCRIPTION:

General: Perennial with deciduous or overwintering leaves arising from short, stout rhizomes.

Leaves: Broadly lanceolate, 30-120 cm long, 10-40 cm wide, 2-pinnate, pinnules on short stalks; marginal teeth with pointed tips.

Sori: Rounded, attached close to the midvein; indusia round, fringed with hairs.

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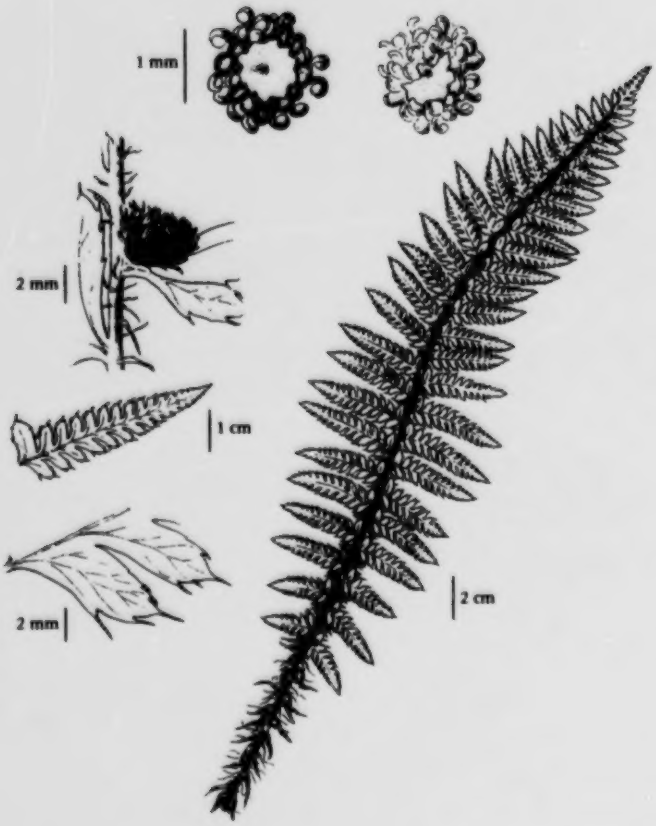
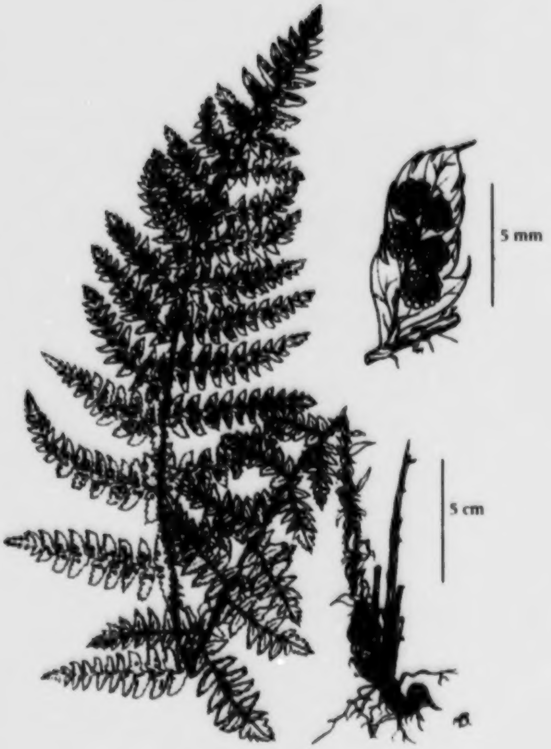
[19] See Excluded Species.


1 mm
2 mm
1 cm
2 mm
2 cm

Polystichum andersonii



Polystichum braunii

Polystichum imbricans **(D.C. Eaton) D.H. Wagner ssp.** ***imbricans*** (*P. munitum* var. *imbricans* [D.C. Eaton] Maxon)
narrow-leaved sword fern

HABITAT/RANGE:

Dry rock outcrops, forest margins and open forests in the lowland zone; infrequent in BC on SE Vancouver Island, adjacent mainland coast, and lower Fraser River Valley; S to CA.

DESCRIPTION:

General: Evergreen perennial arising from a short, stout rhizome.

Leaves: Lanceolate, 20-70 cm long, 3-15 cm wide, 1-pinnate; pinnae oblong, overlapping and twisted 45° or more to the plane of blade, with spreading teeth.

Sori: Round, attached near the midvein; indusia with entire margins.

Polystichum kruckebergii **W.H. Wagner**
Kruckeberg's holly fern

HABITAT/RANGE:

Dry to mesic ultramafic rock outcrops and talus in the montane and subalpine zones; rare in SW BC (Cascade Mountains and southern Coastal Ranges, disjunct to the Cassiar Mountains); S to MT, UT, ID and CA.

DESCRIPTION:

General: Evergreen perennial arising from a short, stout rhizome.

Leaves: Lanceolate, 10-40 cm long, 3-7 cm wide, 1-pinnate, with short stipes; pinnae oblong, deeply cut, with ascending teeth, pinnae twisted out of plane of blade.

Sori: Round, attached near the midvein; indusia entire.

Polystichum lemmonii **Underw.** (*P. mohrioides* [Bory] K.B. Presl var. *lemmonii* [Underw.] Fern.)
Lemmon's holly fern

HABITAT/RANGE:

Dry to mesic, ultramafic rock outcrops in the montane zone; rare in BC, known only from Okanagan Highland; S to ID and CA.

DESCRIPTION:

General: Evergreen perennial arising from a short, stout rhizome.

Leaves: Lanceolate, 10-40 cm long, 3-7 cm wide, 2-pinnate, with short stipes; pinnae egg-shaped, with rounded pinnules, the ultimate segments entire or weakly toothed.

Sori: Round, attached near the midvein; indusia entire or minutely toothed.

Polystichum lonchitis **(L.) Roth**
northern holly fern

HABITAT/RANGE:

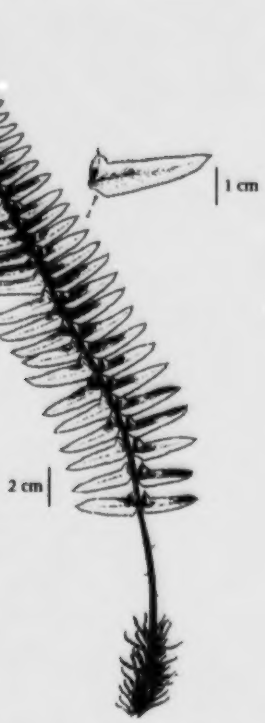
Dry to moist, often calcareous rocks and rocky scree in the montane to alpine zones; frequent throughout BC; circumpolar, N to AK, E to NS and S to MI, MN, SD, CO, AZ and CA; Eurasia.

DESCRIPTION:

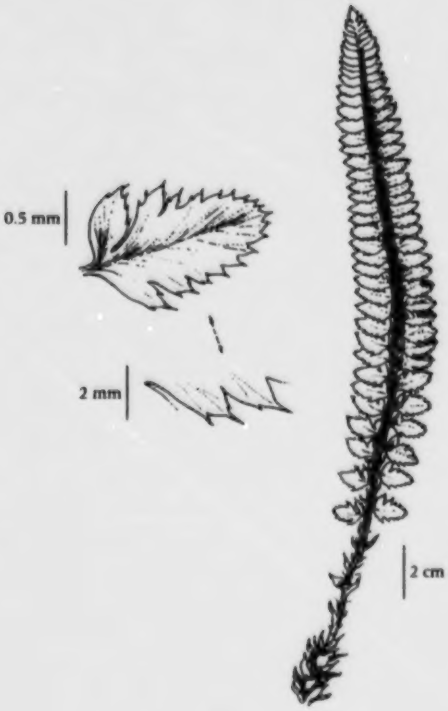
General: Evergreen perennial arising from a short, stout rhizome.

Leaves: Lanceolate, 10-50 cm long, 3-7 cm wide, 1-pinnate; pinnae oblong, the lowermost pinnae triangular, with spreading teeth.

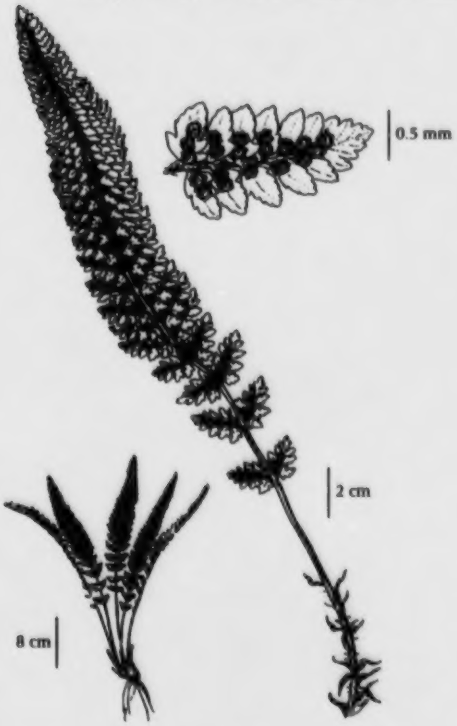
Sori: Round, attached near the midvein; indusia entire or minutely toothed.



Polystichum imbricans ssp. *imbricans*


0.5 mm
2 mm
2 cm

Polystichum kruckebergii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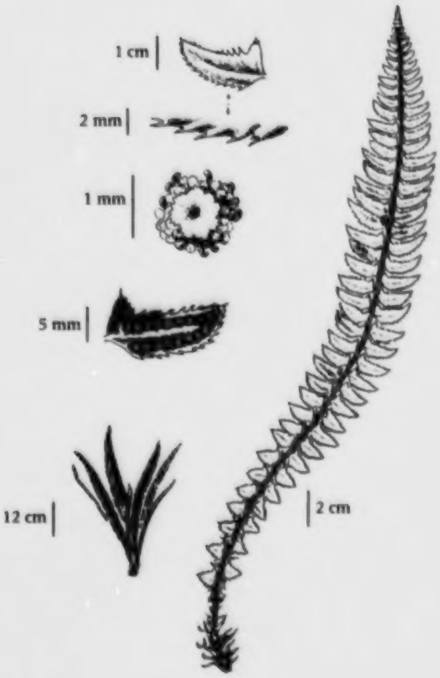
2 cm
8 cm

Polystichum lemmonii


1 cm
2 mm
1 mm
5 mm
12 cm
2 cm

Polystichum lonchitis

Polystichum munitum **(Kaulf.) K.B. Presl**
sword fern
HABITAT/RANGE:
Moist to mesic forests in the lowland and montane zones; common in coastal BC, rare in SC and SE BC south of 54° N, rare northward; N to AK and S to SD, MT, ID and CA.
DESCRIPTION:
General: Evergreen perennial arising from a short, stout rhizome.

Leaves: Lanceolate, 20-150 cm long, 5-25 cm wide, 1-pinnate; pinnae oblong, all of them more or less in one plane, with spreading teeth.

Sori: Round, attached near the midvein; indusia with fringed margins.

Polystichum scopulinum **(D.C. Eaton) Maxon**
mountain holly fern
HABITAT/RANGE:
Dry to mesic, shady, ultramafic rock outcrops of the montane zone; rare in SC BC, known only from the Tulameen River valley; disjunct E to PQ and S to CO, AZ, and CA.
DESCRIPTION:
General: Evergreen perennial arising from a short, stout rhizome.

Leaves: Lanceolate, 10-40 cm long, 3-7 cm wide, 1-pinnate, with stipe longer than 1/3 of the blade; pinnae oblong, arranged in plane of blade, deeply cut, with spreading teeth.

Sori: Round, attached near the midvein; indusia entire or fringed on the margins.

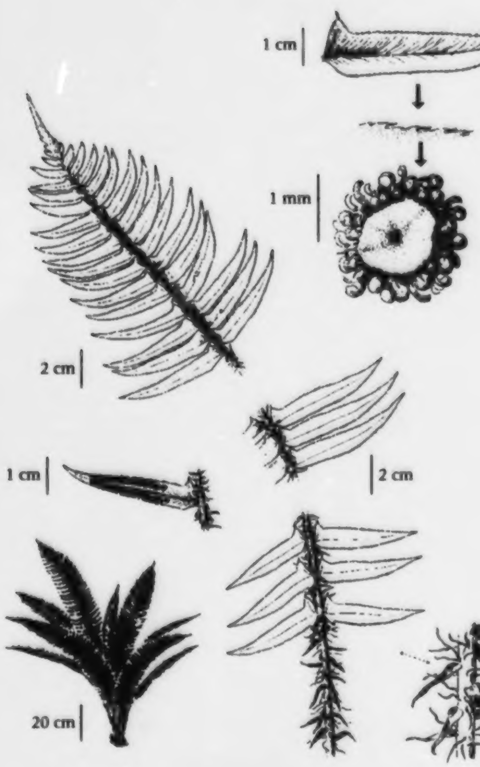
Polystichum setigerum **(K.B. Presl) K.B. Presl** (*P. braunii* ssp. *alaskense* [Maxon] Calder & Taylor)
Alaska holly fern
HABITAT/RANGE:
Moist to mesic shady forests, rock outcrops and lava flows in the lowland and montane zones; rare in coastal NW BC; N to AK.
DESCRIPTION:
General: Deciduous or overwintering perennial arising from a short stout rhizome.

Leaves: Broadly lanceolate, 30-100 cm long, 5-30 cm wide, 2-pinnate, pinnae pinnate again, but their segments on short stalks, finely spiny-toothed with teeth spreading, ascending.

Sori: Rounded, attached close to the midvein; indusia round, fringed with long hairs.

WOODSIA

1. Stipes not jointed above base, fracturing unevenly and leaving persistent stipe-bases of uneven length; leaf blades glandular.
    2. Pinnae and rachis with multicellular hairs; glands on pinnae both unstalked and multicellular, elongate .... *W. scopulina*
    2. Pinnae and rachis without multicellular hairs; all glands on pinnae unstalked .... *W. oregana*
1. Stipes jointed, with slightly thickened, darker joints close to the base, fracturing evenly and leaving persistent stipe-bases of similar length; leaf blades mostly without glands or with only occasional glands.
    3. Rachis and pinnae with very scattered multicellular, white hairs, without chaffy scales; stipes straw-yellow to yellowish-green, dark brown only at the base; chaffy scales only on the base of the stipe .... *W. glabella*
    3. Rachis and lower side of pinnae with scattered brown and whitish hairs, and also with chaffy scales; stipes and rachis reddish-brown to dark purple.
        4. Stipes and the lower surfaces of pinnae with numerous reddish-brown scales; pinnae of the middle part of the frond 2-2.5 times longer than wide, those at the base with 3-6 deep incisions on each side .... *W. ilvensis*
        4. Stipes and the lower surfaces of pinnae chaffy with a few, often light scales; pinnae in the middle part of the frond 1-1.5 times as long as wide, those at the base with 1-2 deep incisions on each side .... *W. alpina*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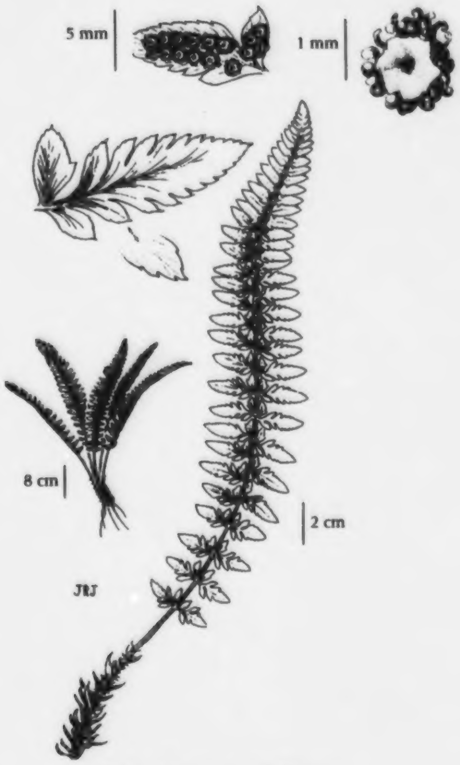
20 cm
JRJ

Polystichum munitum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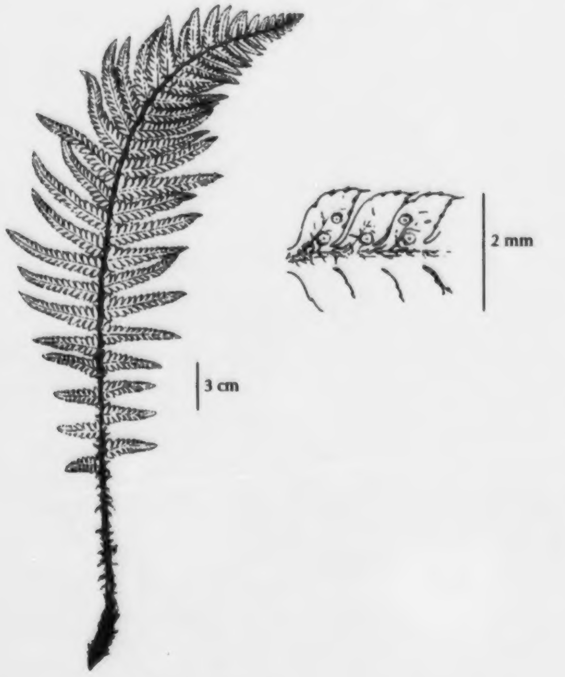
JRJ

Polystichum scopulinum



Polystichum setigerum

Woodsia alpina **(Bolton) S. F. Gray**

alpine cliff fern

HABITAT/RANGE:

Moist calcareous rocks in the montane and subalpine zones; rare in N BC; circumpolar, N to AK, YT and NT, E to NF and S to ME, NY, MI and MN; Eurasia.

DESCRIPTION:

General: Deciduous perennial arising in clusters from a short rhizome.

Leaves: Narrowly lanceolate, 3-20 cm long, 0.5-3 cm wide, 2-pinnate, stipes jointed, rachis with scattered hairs and scales; ultimate segments fan-like, with shallow teeth towards the tips.

Sori: Rounded; indusia of narrow, hairlike segments.

Notes: Plants of *W. alpina* resemble diminutive plants of *Cystopteris fragilis*.

Woodsia glabella **R. Br.**

smooth cliff fern

HABITAT/RANGE:

Moist rocky crevices in the montane and subalpine zones; infrequent in E BC; circumpolar, N to AK, YT and NT, E to NF and S to NH, NY, MI and MN; Eurasia.

DESCRIPTION:

General: Deciduous perennial with overwintering leaves arising in clusters from a short rhizome.

Leaves: Narrowly lanceolate, 4-10 cm long, 0.5-1 cm wide, with jointed stipe and 1-pinnate blade with scattered brown and whitish hairs, but lacking chaffy scales; segments deeply cut.

Sori: Rounded; indusia with hair-like segments.

Notes: Plants of *W. glabella* resemble *Asplenium viride*.

Woodsia ilvensis **(L.) R. Br.**

rusty cliff fern

HABITAT/RANGE:

Dry rocks and scree slopes in the montane to alpine zones; infrequent in N, SC and E BC; circumpolar, N to AK, YT and NT, E to NF and S to NC, IL and MN; Eurasia.

DESCRIPTION:

General: Deciduous perennial arising in clusters from a short rhizome.

Leaves: Narrowly lanceolate, 3-20 cm long, 1.5-4 cm wide, with jointed stipes and 2-pinnate blades; rachis with abundant hairs and scales, but without glands; segments entire or shallowly lobed.

Sori: Rounded; indusia of hairlike narrow segments.

Woodsia oregana **D.C. Eaton ssp. *oregana***

western cliff fern

HABITAT/RANGE:

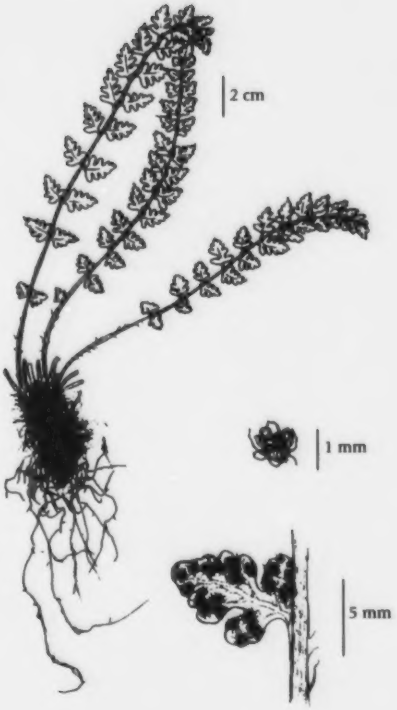
Dry to mesic rocks and talus slopes, in the steppe and montane zones; infrequent in BC east of Coast-Cascade Mountains, mostly south of 55° N; E to PQ and S to VE, OK, NM, and CA.

DESCRIPTION:

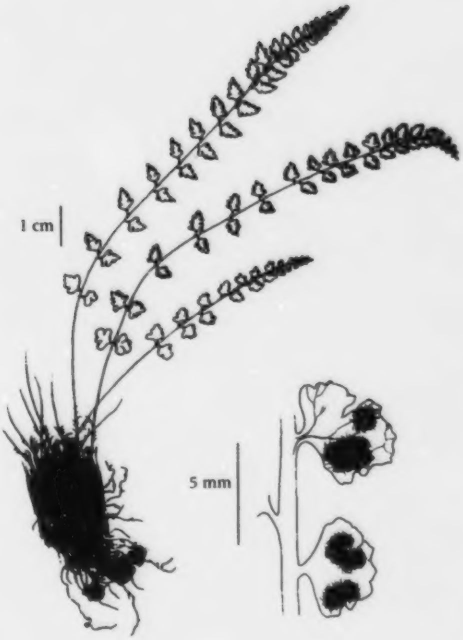
General: Deciduous perennial arising in clusters from a short rhizome.

Leaves: Broadly lanceolate, 4-20 cm long, 1-4 cm wide, 2-pinnate with non-jointed stipe and rachis with glands and without multicellular hairs; ultimate segments shallowly lobed.

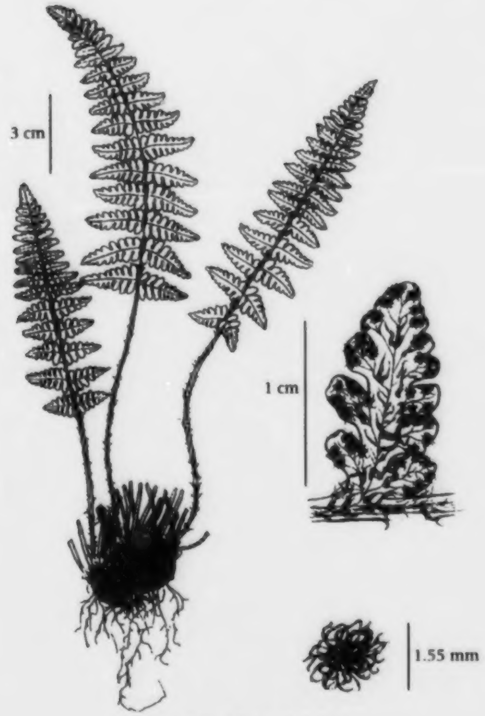
Sori: Rounded; indusia of hair-like segments.



Woodsia alpina



Woodsia glabella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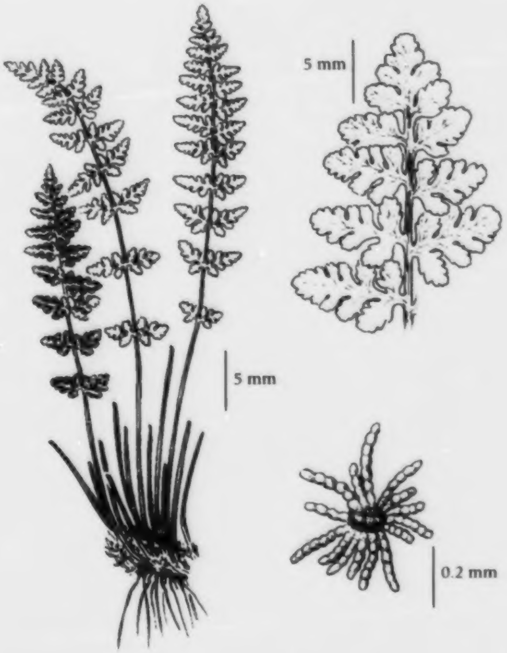
Woodsia ilvensis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5 mm
0.2 mm

Woodsia oregana ssp. *oregana*

Woodsia scopulina **D.C. Eaton** (*W. scopulina* ssp. *laurentiana* Windham)
mountain cliff fern

HABITAT/RANGE:

Dry to mesic rocky crevices and scree slopes, from the lowland and steppe to subalpine zones; frequent in W BC and in SC BC, mostly south of 55° N; N to AK and YT, E to PQ and S to SD, WY, CO, NM, AZ and CA, disjunct in VA, TN and AR.

DESCRIPTION:

General: Deciduous perennial in large clusters arising from a short rhizome.

Leaves: Broadly lanceolate, 8-35 cm long, 2-7 cm wide with non-jointed stipes and 2-pinnate blades; rachis and segments with multicellular glandular and non-glandular hairs.

Sori: Rounded; indusia of hairlike segments.

Notes: Two subspecies are reported from BC by Windham (1993b) but the differences are minor and few botanists would be able to separate the ssp. *scopulina* from ssp. *laurentiana* in the field.

HYMENOPHYLLACEAE

HYMENOPHYLLUM

Hymenophyllum wrightii **van den Bosch** (*Mecodium wrightii* [van den Bosch] Copeland)
Wright's filmy fern

HABITAT/RANGE:

Wet shady rock cliffs and boulders in forests and epiphytic on trees in the lowland zone; infrequent in coastal BC, sporophytes rare, found only on Queen Charlotte Islands, male gametophytes known from the coast from AK to Long Beach, Vanouver Island; amphiberingian, N to AK; E Asia.

DESCRIPTION:

General: Perennial, deciduous, slender fern with fronds arising singly from long creeping rhizomes.

Leaves: Triangular egg-shaped, 2-5 cm long, 1-2 cm wide, 2- to 3-pinnate; ultimate segments oblong, with entire margins.

Sori: Elongated at the tip of the segments, covered with two-valved indusia; gametophytes ribbon-like, branched, with plate-like gemmae.

MARSILEACEAE

MARSILEA

Marsilea vestita **Hook. & Grev.**
hairy water-clover

HABITAT/RANGE:

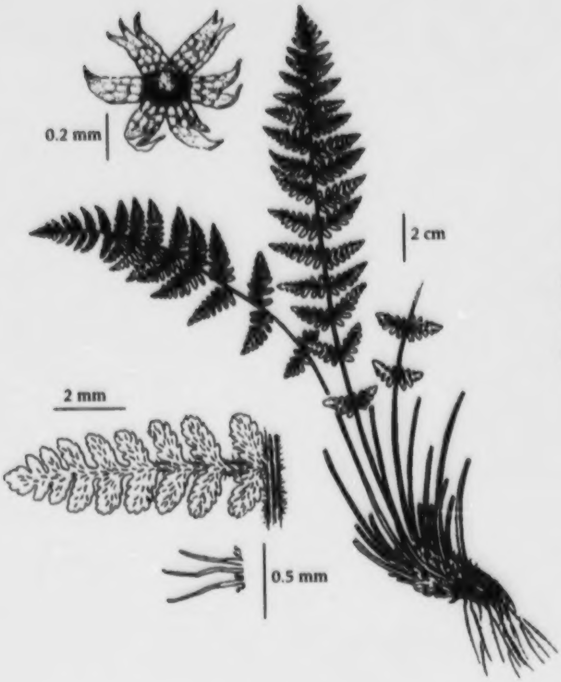
Inundated lake margins in the steppe and montane zones; rare in SC BC; E to SK and S to FL, LA, TX, NM, AZ, CA and MX.

DESCRIPTION:

General: Semi-terrestrial perennial with leaves arising in small clusters from a thin creeping rhizome.

Leaves: With 4 rounded segments (leaflets), resembling a 4-leaved clover; individual leaflets rounded or wedge-shaped elliptical, 0.5-3 cm long and about as wide, submerged or floating on the water surface, or in terrestrial plants standing on thread-like stipes.

Sporangia: Enclosed in sporocarps, pod-like hairy structures formed at the base of the leaves.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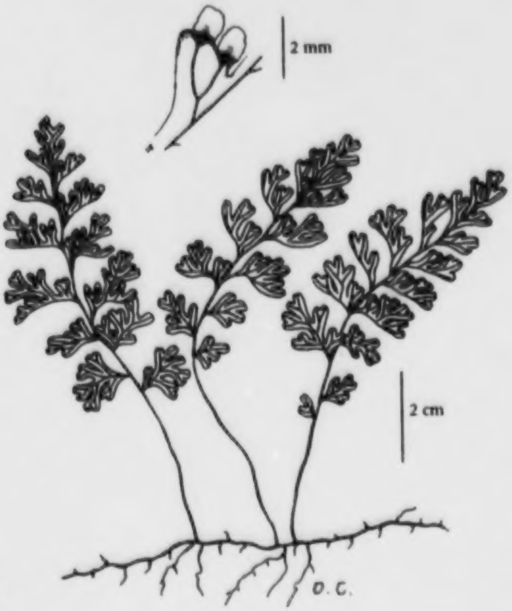
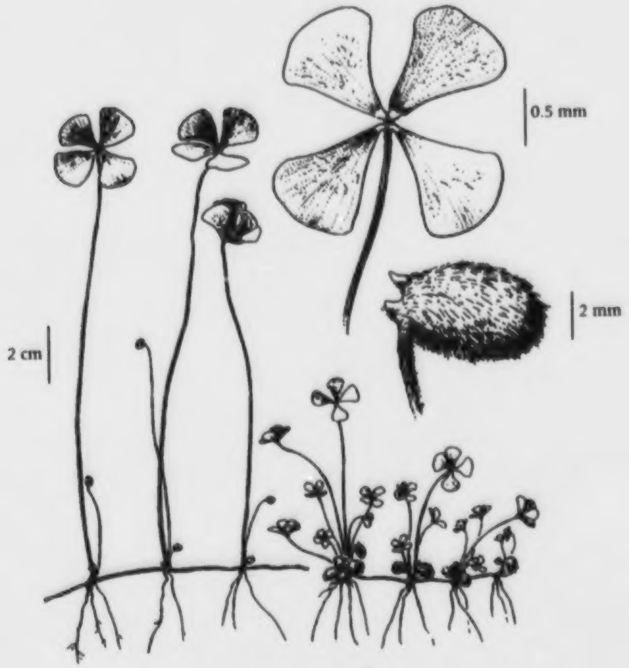
0.5 mm

Woodsia scopulina



Hymenophyllum wrightii


0.5 mm
2 mm
2 cm

Marsilea vestita

POLYPODIACEAE

POLYPODIUM

1. Leaves leathery; veins forming a network; rhizomes white .... *P. scouleri*

1 Leaves not leathery; veins free; rhizomes green with yellowish or orange tinge.

  2. Leaves with rusty hairs on the rachis on the upper side of the leaves, close to the tip .... *P. glycyrrhiza*

  2. Leaves without rusty hairs or with occasional hairs on the upper side of the rachis.

    3. Sori oval, located toward the middle of the pinnae segments, without or with only a few dark, glandular, aborted sporangia (sporangiasters) .... *P. hesperium*

    3. Sori oval, located near the margins of the pinnae segments marginal, with numerous dark, glandular, aborted sporangia (sporangiasters).

      4. Leaves yellow-green, with scattered glandular hairs above; frond segments with pointed to rounded tips; the lower part of the rachis usually with a few dark scales .... *P. sibiricum*

      4. Leaves greyish-green, without glandular hairs above; the frond segments mostly with blunt tips; dark scales on the lower part of rachis usually absent .... P. *amorphum*

***Polypodium amorphum* Suksd.** (*P. montense* Lang)
irregular polypody

HABITAT/RANGE:

Dry to mesic rocks and rock fissures from the lowland to subalpine zones; infrequent in coastal BC and in the Fraser River Canyon; S to OR.

DESCRIPTION:

General: Perennial evergreen arising singly or in small clusters along an elongated, scaly rhizome.

Leaves: Lanceolate, 4-40 cm long, 2-7 cm wide, leathery, oblong, pinnately cleft with broad, rounded sinuses and oblong entire segments with more or less parallel sides; rachis smooth throughout.

Sori: Rounded without indusia, with numerous (more than 12) sterile sporangiasters; sporangiasters with glands on the top.

***Polypodium glycyrrhiza* D.C. Eaton** (*P. vulgare* L. var. *occidentale* Hook., *P. occidentale* [Hook.] Maxon)
licorice fern

HABITAT/RANGE:

Dry and seasonally wet rocks, trees, and soil humus in the lowland and montane zones; common in coastal BC; N to SE AK and S to ID and CA, disjunct in AZ.

DESCRIPTION:

General: Evergreen or summer deciduous perennial with a long-creeping, scaly rhizome.

Leaves: Lanceolate, 10-60 cm long, 2-15 cm wide, pinnatifid with sharp deep incisions and elongated pointed segments with toothed margins; rachis with rusty hairs on upper surface in the top one third.

Sori: Rounded, without indusia and without sterile sporangiasters.

***Polypodium hesperium* Maxon** (*P. vulgare* L. var. *columbianum* Gilbert)
western polypody

HABITAT/RANGE:

Dry to mesic rocks from the lowland and steppe to subalpine zones; infrequent throughout BC south of 56° N; E to W AB and S to CO, NM, AZ and CA.

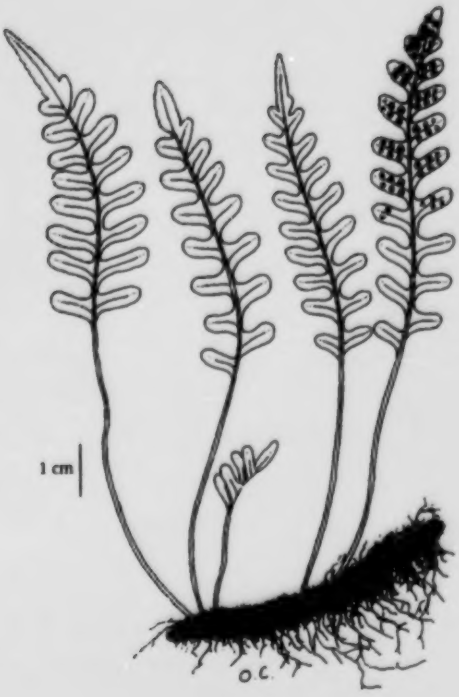
DESCRIPTION:

General: Evergreen perennial from a long creeping scaly rhizome.

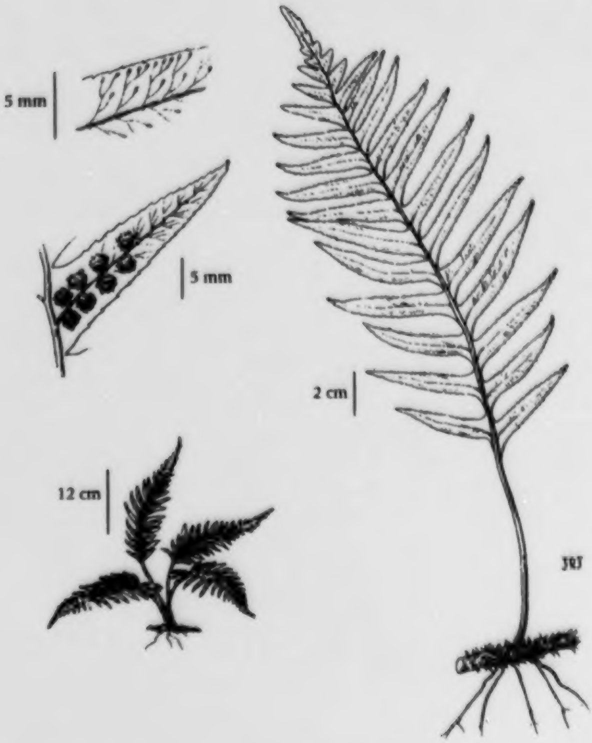
Leaves: Lanceolate, 5-25 cm long, 1-5 cm wide, pinnately cleft with elongated segments, the segments entire or slightly toothed; rachis with a few scattered hairs at the upper side, close to the leaf tip.

Sori: Oval, without indusia, with (5-10) sterile sporangiasters.

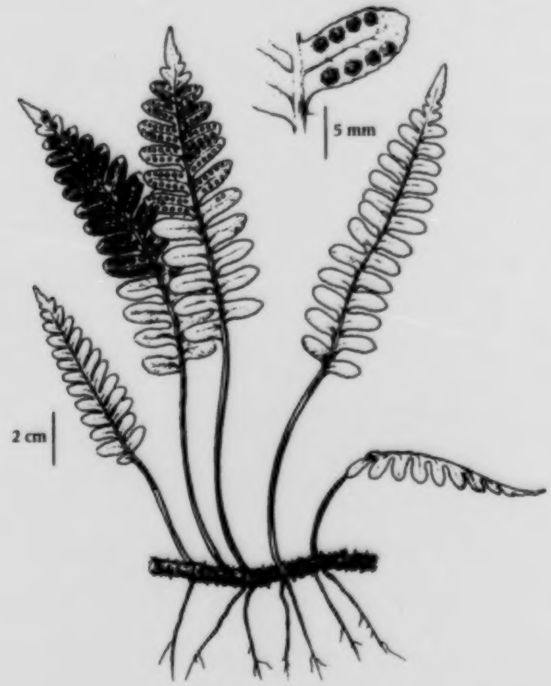
Notes: This is an allotetraploid species that originated from a hybrid of *P. amorphum* and *P. glycyrrhiza*.



Polypodium amorphum


5 mm
5 mm
2 cm
12 cm
JRJ

Polypodium glycyrrhiza



Polypodium hesperium

Polypodium scouleri **Hook. & Grev.**

leathery polypody

HABITAT/RANGE:

Mesic to moist oceanside rock cliffs and trunks and branches of trees (in the salt spray zone) in the lowland zone; frequent on outer coast of Vancouver Island, rare northward to the southern tip of the Queen Charlotte Islands; S to CA.

DESCRIPTION:

General: Evergreen perennial arising from a thick, smooth, naked, white rhizome.

Leaves: Oblong or triangular, 5-60 cm long, 2-15 cm wide, leathery, irregularly pinnately cleft with wide sinuses; leaf margins entire or sparsely finely toothed.

Sori: Round, without sterile sporangiasters.

Notes: In the Barkley Sound area this species hybridizes with *P. glycyrrhiza*.

Polypodium sibiricum **Siplivinskij** (*P. virginianum auct. non* L.)

Siberian polypody

HABITAT/RANGE:

Dry to mesic rocks in the montane zone; rare in C and NE BC, known only from Fort St. James and Fort Nelson; amphiberingian, N to AK, YT and NT, E to PQ; E Asia, Greenland.

DESCRIPTION:

General: Evergreen perennial arising singly or in small clusters along an elongated scaly rhizome.

Leaves: Oblong, 4-20 cm long, 1-4 cm wide, leathery, oblong, pinnately cleft with broad, rounded sinuses and narrow, entire segments with broadly pointed tips; rachis smooth throughout.

Sori: Rounded, without indusia, with numerous (more than 12) sterile sporangiasters; sporangiasters without glands.

PTERIDACEAE

1. Sori clearly separate, borne on underside of bent-back margins of pinnae; ultimate segments broadly diamond-shaped or fan-shaped .... *Adiantum*

1. Sori continuous along the margin of the bent back-frond segments; ultimate segments more or less oblong or linear-lanceolate.

    2. Sori on the lower surface of the frond, not covered by the leaf margin; backs of fronds covered with white or yellowish powder .... *Pentagramma*

    2. Sori on or near the margin of the lower surface of the frond, covered by inrolled indusium-like margin, or apparent margin; backs of fronds without white or yellowish powder.

        3. Stipes herbaceous, green except at base .... *Cryptogramma*

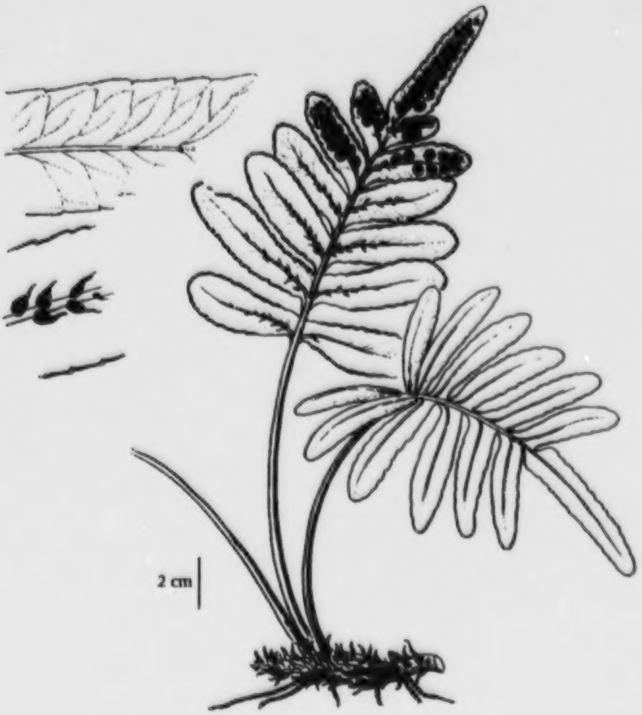
        3. Stipes wiry, dark and shining.

            4. Blades more or less woolly beneath; segments small, the ultimate segments of the leaves less than 5 mm long .... *Cheilanthes*

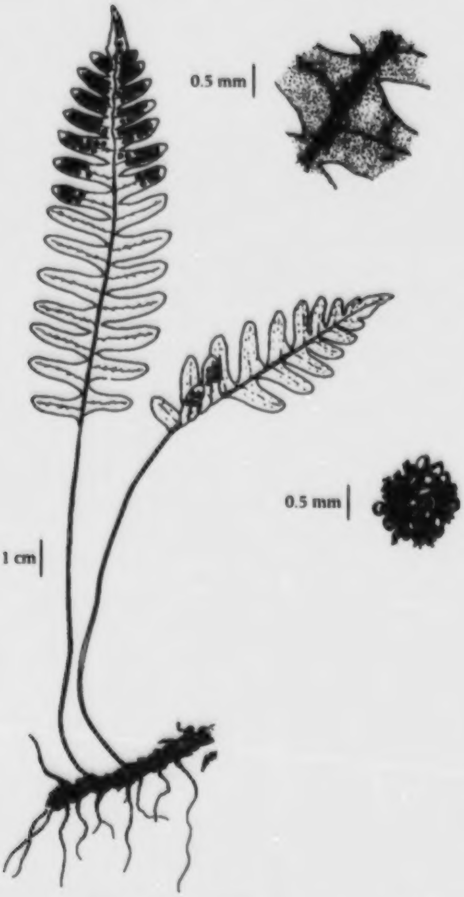
            4. Blades smooth (or hairy but not woolly in *Pellaea*); the ultimate segments more than 5 mm long.

                5. Fronds triangular, not much longer than wide; segments linear, narrowly elongate, the upper surface with deep furrows, shining .... *Aspidotis*

                5. Fronds considerably longer than wide; upper surface of segments flat, not shining .... *Pellaea*



Polypodium scouleri


0.5 mm
0.5 mm
1 cm

Polypodium sibiricum

ADIANTUM

1. Rachis appears branched into equal branches; leaves broad and kidney-shaped in outline; ultimate segments oblong, fan-shaped, 2-4 times longer than wide, attached to straight leaf axes .... *A. aleuticum*

1. Rachis unbranched; pinnae on both sides of the rachis; ultimate segments round to broadly oblanceolate, not more than 2 times longer than wide, attached to conspicuously zigzag flexed leaf axes .... *A. capillus-veneris*

Adiantum aleuticum **(Rupr.) Paris** (*A. pedatum* L. ssp. *aleuticum* (Rupr.) Calder & Taylor, var. *aleuticum* Rupr., ssp. *calderi* Cody, and var. *subpumilum* Wagner)
northern maiden-hair

HABITAT/RANGE:

Moist forests, rocks, scree, cliffs, banks and waterfall spray zones in the lowland and montane zones; frequent throughout BC, mostly S of 55° N, infrequent in SC BC; amphiberingian, N to AK, E to SW AB and S to CO, AZ and CA; disjunct E to PQ and NF and S to PA, WV and MI; E Asia.

DESCRIPTION:

General: Deciduous perennial, palmately branched, from a stout, scaly rhizome, 15-75 cm tall.

Leaves: Broadly fan-shaped, 10-75 cm long; stalks reddish-brown to purplish-black; blades more or less palmately-pinnate, set at right angles to the stalks and more or less parallel to the ground, 10-40 cm long, 10-40 cm wide, rounded to kidney-shaped, forked at the bases into 2 recurved-spreading divisions which in turn bear 2-several shorter divisions, the larger divisions with 15-35, alternate, short-stalked leaflets, these leaflets 12-22 mm long, 5-9 mm wide, obliquely oblong, the underside straight, the upper side convex, lobed.

Sporangia: Sori (and false indusia formed by inrolled leaf margins) usually 4-6 per leaflet, oblong, less than 3 mm long.

Notes: Small plants with small fronds (5 to 15 cm across) and strongly overlapping ultimate segments were described as *A. pedatum* L. var. *subpumilum* Wagner. They clearly belong to this species, but no formal nomenclatural transfer has been done yet. This variety is rare on coastal bluffs from northern Vancouver Island south to the Olympic Peninsula, WA.

Adiantum capillus-veneris **L.**
southern maiden-hair

HABITAT/RANGE:

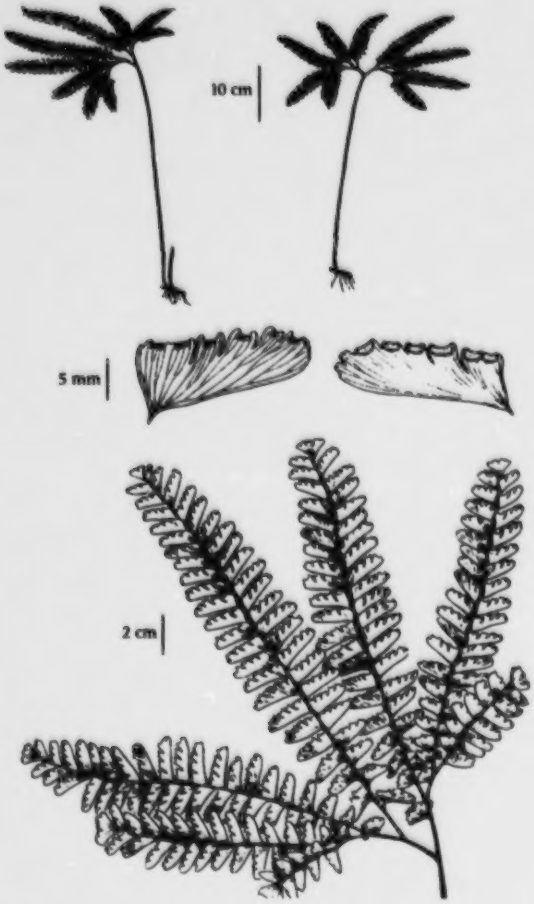
Wet rock walls in the montane zone; rare in E BC (Fairmont Hot Springs); cosmopolitan, disjunct, S to ME, NH, PA, NC, FL, MS, LA, TX, NM, AZ and CA; Europe, S Asia, Africa, S America, Australia.

DESCRIPTION:

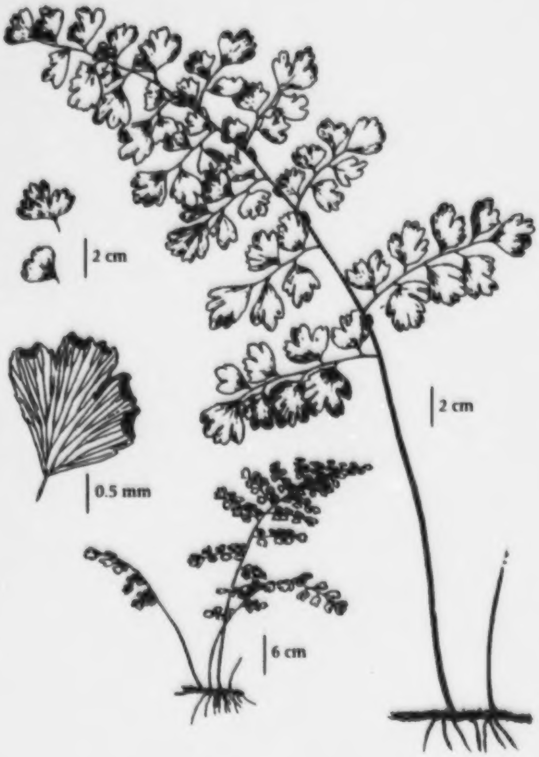
General: Perennial from a slender, black-tinged rhizome.

Leaves: Oval, 5-30 cm long, oval in outline, borne on smooth dark stipes, pinnately 2- to 3-times divided, the segments fan-shaped, 0.5-3 cm long, 0.5-3 cm wide, obtusely lobed.

Sporangia: Sori (and false indusia formed by inrolled leaf margins) 1-3 per leaflet, oblong, 1-2 mm long.


10 cm
5 mm
2 cm

Adiantum aleuticum


2 cm
2 cm
0.5 mm
6 cm

Adiantum capillus-veneris

ASPIDOTIS

Aspidotis densa **(Brackenr.) Lellinger** (*Cryptogramma densa* [Brackenr.] Diels, *Cheilanthes densa* [Brackenr.] St.John, *Cheilanthes siliquosa* Maxon)

Indian's-dream

HABITAT/RANGE:

Dry to moist or seepy rock outcrops in the lowland, steppe and montane zones; infrequent in BC south of 54° N; disjunct E to PQ and S to WY, UT, NV and CA.

DESCRIPTION:

General: Evergreen perennial in dense clumps from a short rhizome.

Leaves: Broadly diamond-shaped, 5-25 cm long, 3- to 4-pinnate into narrow linear segments, 3-10 mm long, segments of sterile leaves broader than those of fertile leaves.

Sporangia: Sori along the margin of fertile segments, 5-8 mm long; indusia linear with shallow regular teeth at the margins.

Notes: East of the Coast-Cascade Mountains this species is restricted to serpentine rock outcrops.

CHEILANTHES

1. Blades and rachis without scales; ultimate segments woolly beneath and thinly woolly above .... *C. feei*

1. Blades and rachis with scales; ultimate segments densely woolly beneath, smooth above ...... *C. gracillima*

Cheilanthes feei **T. Moore**

slender lip fern

HABITAT/RANGE:

Dry calcareous (or other basic) rocks in the steppe and montane zones; infrequent in S BC east of the Coast-Cascade Mountains; E to AB and S to VA, KY, AR, TX, NM, AZ, CA and MX.

DESCRIPTION:

General: Evergreen perennial in clumps from a short compact rhizome.

Leaves: Broadly lanceolate, 5-20 cm long, clustered, hairy, but without scales, 3-pinnate; ultimate segments round, 0.5-3 mm long, densely brown-woolly on the lower sides.

Sporangia: Sori continuous around segment margins; indusia false, formed by inrolled leaf margins.

Cheilanthes gracillima **D.C. Eaton**

lace fern

HABITAT/RANGE:

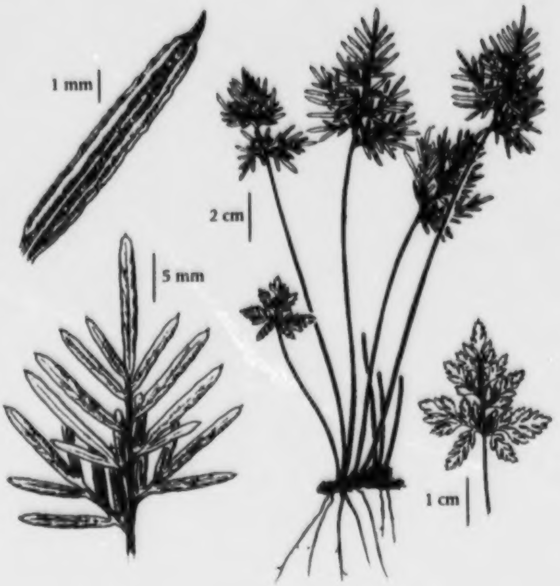
Dry rocks and rock crevices in the lowland, steppe and montane zones; rare in extreme S BC; S to MT, UT, NV and CA.

DESCRIPTION:

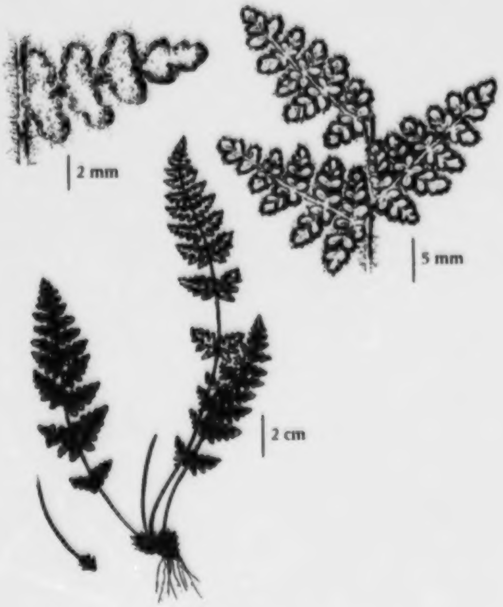
General: Evergreen perennial in clumps from a short compact rhizome.

Leaves: Broadly lanceolate, 5-25 cm long, clustered, hairy with branched hairs and whitish scales, 3-pinnate; ultimate segments round, 0.5-3 mm long, with densely orange-woolly branched hairs and small scales on the lower surface.

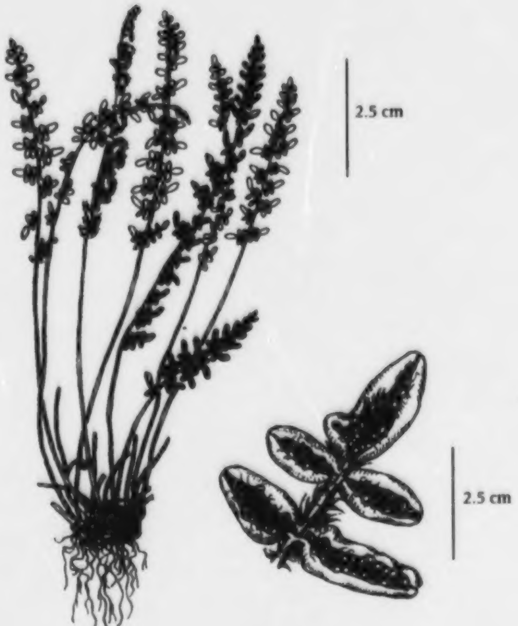
Sporangia: Sori continuous around segment margins; indusia false, formed by inrolled leaf margins.


1 mm
2 cm
5 mm
1 cm

Aspidotis densa



Cheilanthes feei



Cheilanthes gracillima

CRYPTOGRAMMA[20]

1. Rhizomes slender, creeping; leaves scattered along the rhizome, delicate; sterile leaves egg-shaped to lanceolate in outline .... *C. stelleri*

1. Rhizomes stout; leaves tufted, relatively coarse; sterile leaves broadly egg-shaped to almost triangular in outline.

   2. Mature leaves soft, thin and translucent when dried, deciduous in autumn; dried leaves of a previous year not persisting on the plant; the upper side of leaves lacking cylindrical hairs on veins .... *C. cascadensis*

   2. Mature leaves leathery, opaque, evergreen; dried leaves of previous year persisting on the plant; the upper side of leaves with cylindrical hairs on veins.

      3. Sterile leaves 2- to 3- pinnate, coarsely dissected; their ultimate segments elongated, lanceolate or oblanceolate with 6-12 or more teeth or shallow lobes .... *C. acrostichoides*

      3. Sterile leaves 2- to 4- pinnate, finely dissected; their ultimate segments egg-shaped, with 2-6 deep lobes .... *C. sitchensis*

Cryptogramma acrostichoides **R. Br.** (*C. crispa* [L.] R. Br. Hook. var. *acrostichoides* [R. Br.] C.B. Clarke, ssp. *acrostichoides* [R. Br.] Hult.)

parsley fern

HABITAT/RANGE:

Dry rocks from the lowland to alpine zones; frequent in coastal BC, infrequent in SC BC; amphiberingian, N to AK, YT and NT, E to ON and S to MI, NM, AZ and CA; E Asia.

DESCRIPTION:

General: Evergreen perennial in clumps from a compact rhizome.

Leaves: Densely tufted, overwintering, the stipes of old leaves persisting at the base; sterile leaves spreading, oblong-triangular, 5-20 cm long, 2- to 3-pinnate, their segments oblong or egg-shaped; fertile leaves erect, narrowly triangular, their segments linear, 3-12 mm long.

Sporangia: Sori linear along the margins of fertile segments; margins of segments forming false indusia.

Cryptogramma cascadensis **Alverson**

Cascade parsley fern

HABITAT/RANGE:

Dry to mesic rocks and rocky scree slopes in the alpine zone; rare in BC (Revelstoke, Cascade Mountains); S to MT, ID and CA.

DESCRIPTION:

General: Deciduous perennial in clumps from a compact rhizome.

Leaves: Densely tufted, deciduous, the stipes of old leaves not persisting at the base; sterile leaves spreading, broadly triangular, 5-20 cm long, 2- to 3-pinnate, their segments oblong or egg-shaped, each of them with 4-8 teeth; fertile leaves erect, narrowly triangular, their segments linear, 3-12 mm long.

Sporangia: Sori linear along the margins of fertile segments; margins of segments forming false indusia.

Cryptogramma sitchensis **(Rupr.) T. Moore** (*C. acrostichoides* R. Br. var. *sitchensis* [Rupr.] C. Christensen)

Sitka parsley fern

HABITAT/RANGE:

Dry to mesic rocks and talus slopes from the lowland to alpine zones; infrequent in NW BC; N to AK, YT and NT.

DESCRIPTION:

General: Evergreen perennial in clumps from a compact rhizome.

Leaves: Densely tufted, overwintering, the stipes of old leaves persisting at the base; sterile leaves spreading, broadly triangular, 5-20 cm long, 3- to 4-pinnate, their segments oblong or egg-shaped, each with 8-16 teeth; fertile leaves erect, narrowly triangular, their segments linear, 3-12 mm long.

Sporangia: Sori linear along the margins of fertile segments; margins of segments forming false indusia.

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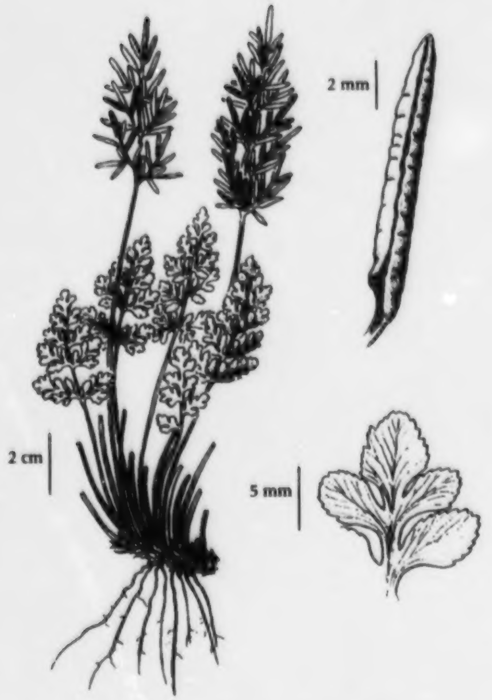
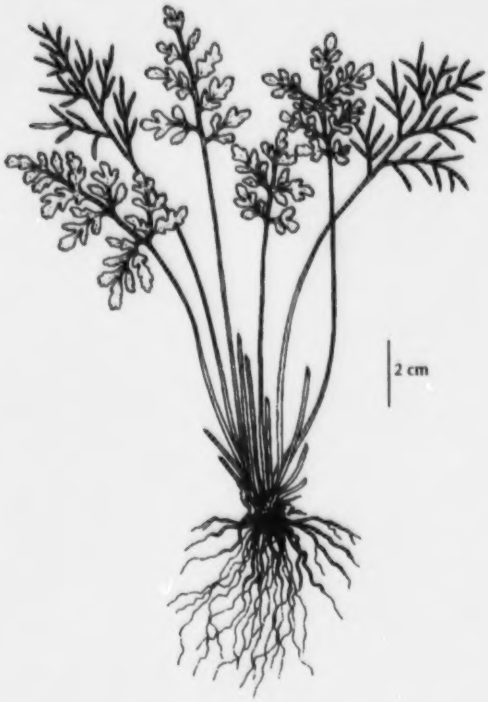
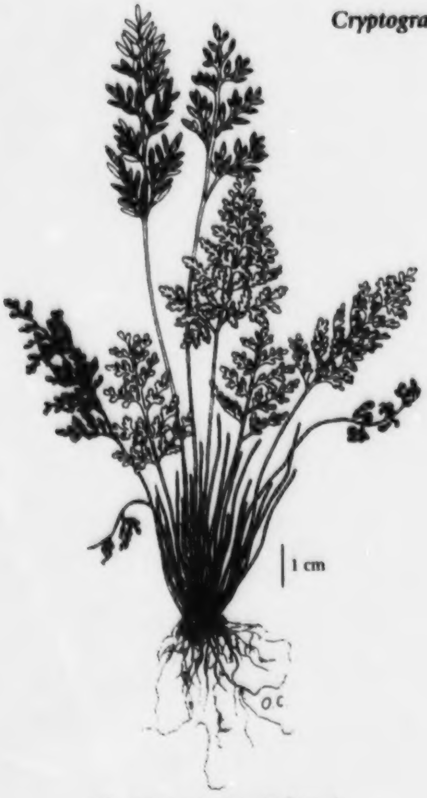
[20] Contributed by E.R. Alverson & A. Ceska.



Cryptogramma acrostichoides



Cryptogramma cascadensis



Cryptogramma sitchensis

Cryptogramma stelleri **(Gmel.) Prantl**

slender rock-brake

HABITAT/RANGE:

Wet crevices in calcareous rocks from the steppe and montane to alpine zones; infrequent throughout BC; circumpolar, N to AK, YT and NT, E to AB and S to CO, UT, NV and OR, disjunct to ON and NF and S to ME, NH, PA, WV, IL and IA; N Eurasia.

DESCRIPTION:

General: Deciduous perennial from a long creeping rhizome.

Leaves: Thin, 3-15 cm long, from deeply pinnately lobed to 2-pinnate, segments of sterile leaves oblong, egg-shaped to fan-shaped; fertile leaves only slightly differentiated from the sterile ones, their segments narrower than in sterile leaves.

Sporangia: Sori linear along the leaf margins; margins of segments forming false indusia.

PELLAEA

1. Ultimate segments smooth on lower surface except for occasional hairlike scales near midrib; rachis nearly smooth .... *P. glabella*
1. Ultimate segments with sparse woolly hairs on lower surface near midrib; rachis sparsely woolly with long divergent hairs .... *P. gastonyi*

Pellaea gastonyi **Windham** (*P. atropurpurea auct. non* [L.] Link *pro parte*)

Gastony's cliff-brake

HABITAT/RANGE:

Dry calcareous cliffs and crevices in the montane and subalpine zones; rare in SE BC; E to SK and disjunct in WY, SD, and MO.

DESCRIPTION:

General: Evergreen perennial in small clusters from a short, stout rhizome.

Leaves: Of 2 slightly different forms, sterile leaves shorter than fertile leaves, oblong or triangular, 5-25 cm long, 2-7 cm wide, 2-pinnate towards the base, 1-pinnate in the upper part; segments leathery, sparsely woolly along the midrib, with recurved margins.

Sporangia: Scattered along the margins; indusia lacking.

Pellaea glabella **Mettenius *ex* Kuhn ssp. *simplex* (Butters) A. & D. Löve** (*Pellaea atropurpurea auct. non* [L.] Link, *P. occidentalis* ssp. *simplex* [Butters] Gastony, *P. suksdorfiana* Butters)

simple cliff-brake

HABITAT/RANGE:

Dry to mesic crevices of calcareous rocks in the steppe, montane, and subalpine zones; infrequent in C and SC BC; E to AB and S to NM, AZ, NV and WA.

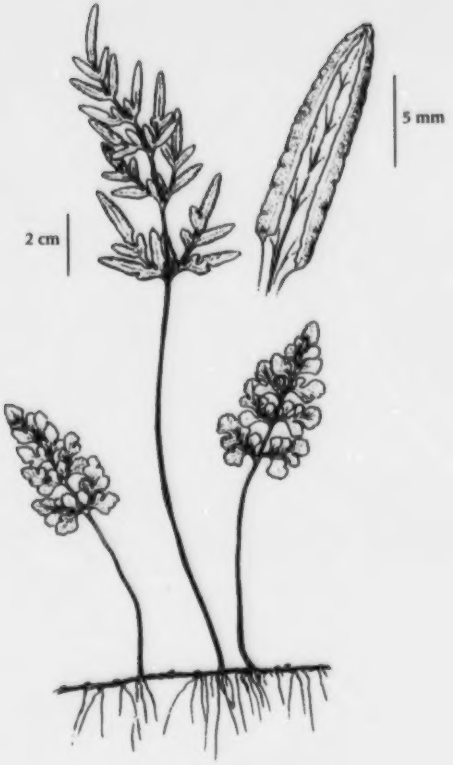
DESCRIPTION:

General: Evergreen perennial in small clusters from a short, stout rhizome.

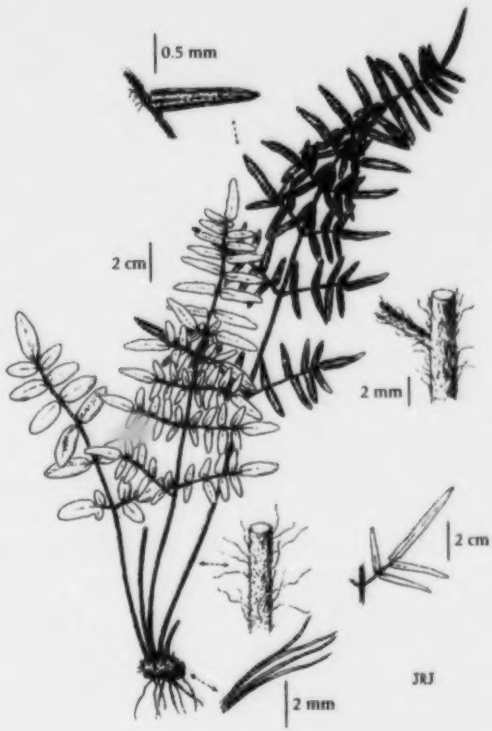
Leaves: Sterile leaves the same as fertile leaves, oblong or triangular in their outline, 5-35 cm long, 2-7 cm wide, 2-pinnate towards the base, 1-pinnate in the upper part; segments leathery, smooth, with recurved margins.

Sporangia: Scattered along the margins; indusia lacking.

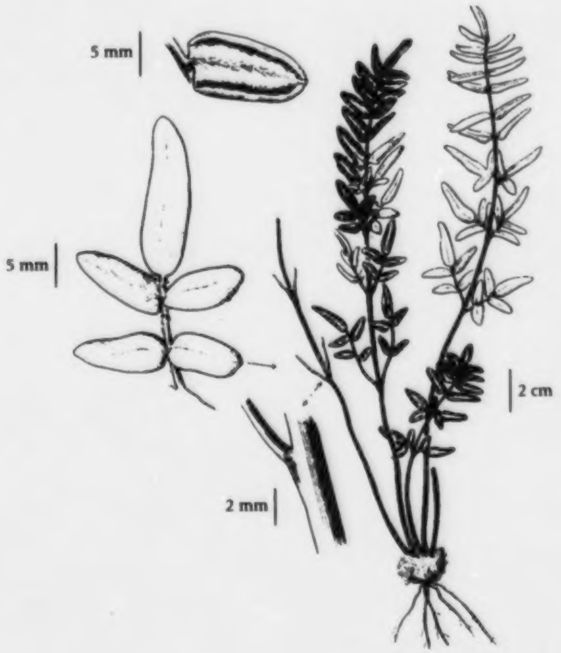
Notes: According to the recent treatment of *Pellaea* by Windham (1993a,b), British Columbia plants of "*P. atropurpurea*" are treated either as *P. gastonyi* or *P. glabella* ssp. *simplex*.



Cryptogramma stelleri


0.5 mm
2 cm
2 mm
2 cm
2 mm
JRJ

Pellaea gastonyi


5 mm
5 mm
2 cm
2 mm

Pellaea glabella ssp. simplex

PENTAGRAMMA

Pentagramma triangularis **(Kaulf.) Yatskievych, Windham & Wollenweber ssp.** ***triangularis*** (*Pityrogramma triangularis* [Kaulf.] Maxon)

goldenback fern

HABITAT/RANGE:

Dry rocky crevices in the lowland zone; infrequent on SE Vancouver Island, Gulf Islands and adjacent mainland coast; S to ID, NV and CA.

DESCRIPTION:

General: Evergreen perennial arising in clusters from a short, stout rhizome.

Leaves: Leathery on stipes longer than blades, blades triangular, 3-15 cm long, 2-15 cm wide, with three pinnae that are pinnately divided into the ultimate segments; the lowermost segments elongated, all segments whitish-powdery underneath.

Sporangia: Along the veins, not forming distinct sori; indusia lacking.

THELYPTERIDACEAE

1. Indusia absent; midribs of pinnae grooved above .... *Phegopteris*
1. Indusia present, kidney-shaped; midribs of pinnae not grooved above .... *Thelypteris*

PHEGOPTERIS

Phegopteris connectilis **(Michx.) Watt** (*Thelypteris phegopteris* [L.] Slosson)

narrow beech fern

HABITAT/RANGE:

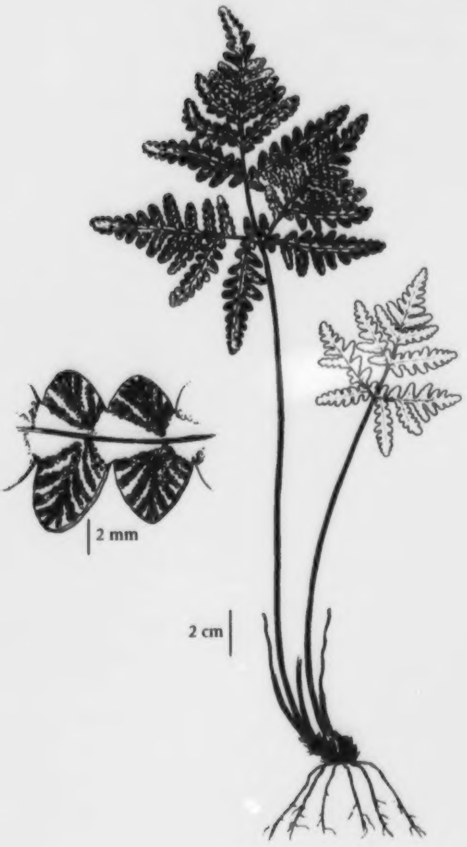
Most to wet forests, streambanks, shaded seepy rock cliffs and swamps from the lowland to subalpine zones; infrequent throughout BC; circumpolar, N to AK, YT and NT, E to NF and S to NH, NC, TN, IA, MN and OR; Eurasia.

DESCRIPTION:

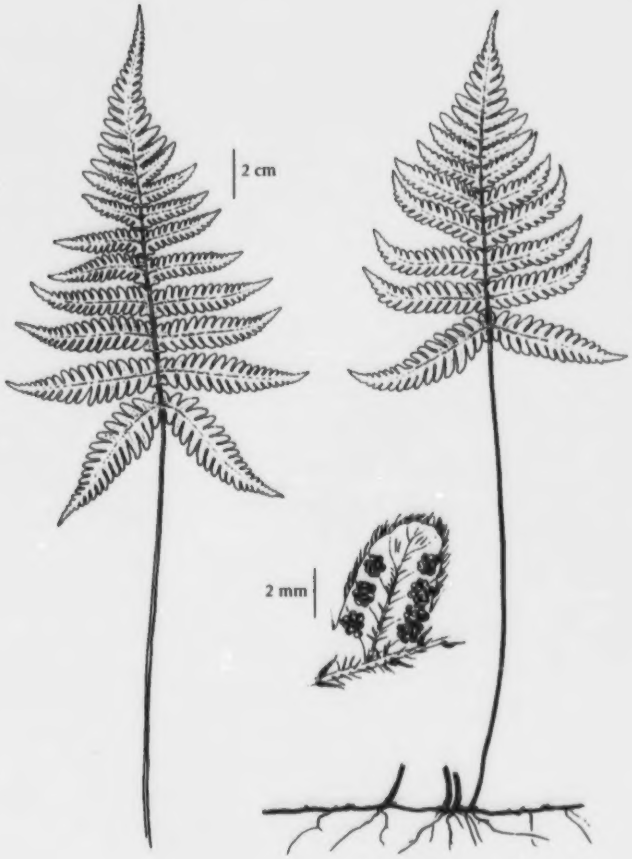
General: Perennial with overwintering fronds arising singly from elongated rhizomes.

Leaves: On stipes as long as blades or longer, blades elongate-triangular, 10-25 cm long and 3-15 cm wide, pinnate; pinnae pinnatifid, the lowermost at an abruptly pointed angle to the stipe and bent outwards; segments hairy underneath.

Sori: Rounded, close to the segment margins; indusia lacking.



Pentagramma triangularis



Phegopteris connectilis

THELYPTERIS

1. Rhizomes short and stout; stipes with numerous scales along their whole length; rachis with dense rusty-brown hairs especially on the upper side; ultimate leaf segments 3-4 mm wide .... *T. quelpaertensis*

1. Rhizomes elongate and slender; stipes with a few scales at the base; rachis sparsely pubescent with inconspicuous hairs; ultimate segments 1.5-2 mm wide .... *T. nevadensis*

Thelypteris nevadensis **(Baker) Clute** (*Parathelypteris nevadensis* [Baker] Holttum)

Nevada marsh fern

HABITAT/RANGE:

Wet to moist gravel bars in the lowland zone (moist in summer, flooded in winter); rare in SW BC, known only from the Sooke River; S to ID and CA

DESCRIPTION:

General: Deciduous perennial arising from a creeping rhizome in small clusters.

Leaves: Elliptic, 20-70 cm long, 5-15 cm wide, pinnately deeply divided; segments entire.

Sori: Rounded, close to the margins; indusia round to kidney-shaped, occasionally with glands.

Thelypteris quelpaertensis **(Christ) Ching** (*Oreopteris quelpaertensis* [Christ] Holub, *T. limbosperma auct. non* All., *T. oreopteris* [Christ] Holub)

mountain fern

HABITAT/RANGE:

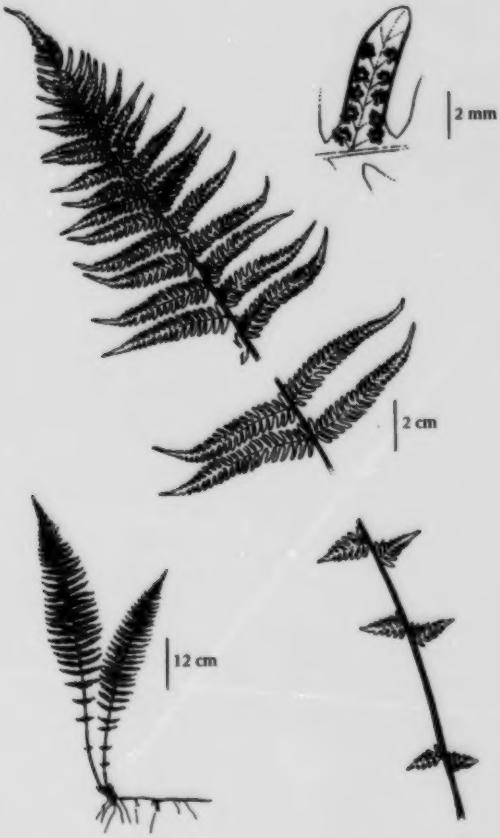
Wet cliffs and rocky slopes in the lowland to subalpine zones; infrequent in coastal BC; amphiberingian, N to AK and S to WA, disjunct in NF; E Asia.

DESCRIPTION:

General: Deciduous perennial arising in tufts from a short stout rhizome.

Leaves: Elliptic, 30-80 cm long, 5-20 cm wide, pinnate to pinnately deeply cleft; segments entire.

Sori: Round, close to the margins; indusia round to kidney-shaped, smooth.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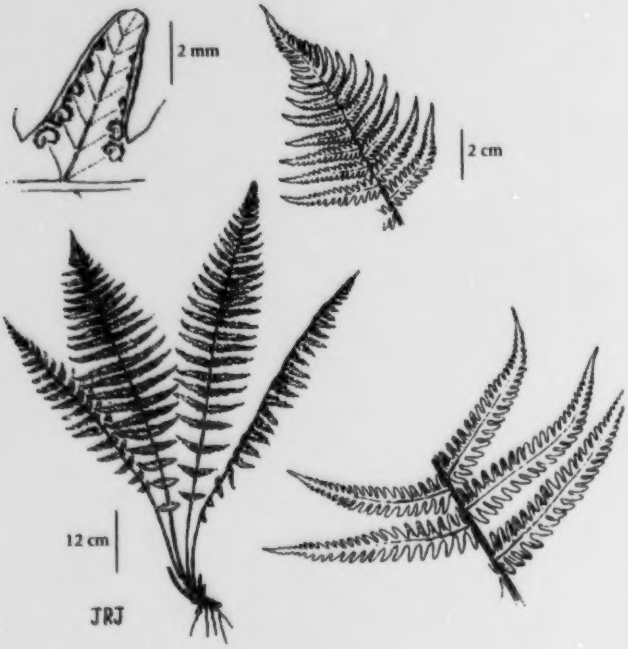
Thelypteris nevadensis


2 mm
2 cm
12 cm
JRJ

Thelypteris quelpaertensis

REFERENCES

General

Abrams, L.R. 1940-60. Illustrated flora of the Pacific States: Washington, Oregon and California. Vols. 1-3. Stanford Univ. Press, Stanford, CA.

Argus, G.W. 1973. The genus *Salix* in Alaska and the Yukon. Natl. Mus. Nat Sci. Pub. Bot. No. 2. Nat. Mus. Can., Ottawa, ON. 279 p.

Bailey, L.H. 1949. Manual of cultivated plants. The Macmillan Co., New York, NY.

Boivin, B. 1966-1967. Enumeration des plants du Canada. Provancheria No. 6. Univ. Laval, PQ.

______. 1968-1969. Flora of the prairie provinces. Provancheria No. 3. Univ. Laval, PQ.

Brayshaw, T.C. 1976. Catkin bearing plants of British Columbia. B.C. Prov. Mus. Occas. Pap. Ser. No. 18. Victoria, BC.

______. 1985. Pondweeds and bur-reeds, and their relatives: Aquatic families of Moncotyledons in British Columbia. B.C. Prov. Mus. Occas. Pap. Ser. No. 26. Victoria, BC.

______. 1996a. Catkin bearing plants of British Columbia (Amentiferae). Royal B.C. Mus., Victoria, BC.

______. 1996b. Trees and shrubs of British Columbia. Royal B.C. Mus., Victoria, BC.

Calder, J.A., and R.L. Taylor. 1968. Flora of the Queen Charlotte Islands, Part 1. Can. Dep. Agric. Res. Branch Monogr. 4. 659 p.

Campbell, R. 1904. Some conspicuous British Columbia plants. Can. Rec. Sci. 9:176-189.

Clark, L.J. 1973. Wild flowers of British Columbia. Gray's Publ. Ltd., Sidney, BC. 591 p.

______. 1976. Wild flowers of the Pacific Northwest. Gray's Publ. Ltd., Sidney, BC. 604 p.

Cody, W.J. 1996. Flora of the Yukon Territory. National Res. Council Press. Ottawa, ON. 643 p.

Cody, W.J. and D.M. Britton. 1989. Ferns and fern allies of Canada. Res. Branch Agric. Can., Ottawa, ON. 430 p.

Dansereau, P. 1975. Biogeography. Ronald Press, New York, NY.

Daubenmire, R. 1970. Steppe vegetation of Washington. Wash. Agric. Exp. Stn. Tech. Bull. 62.

Davis, R.J. 1952. Flora of Idaho. Wm. C. Brown Co., Dubuque, IA. 828 p.

Douglas, G.W. 1971. The alpine-subalpine flora of the North Cascade Range, Washington. Wasmann, J. Biol. 29:129-168.

______. 1972. Subalpine plant communities of the western North Cascades, Washington. Arct. Alp. Res. 4:147-166.

______. 1974. Montane zone vegetation of the Alsek River region, southwestern Yukon. Can. J. Bot. 52:2505-2532.

______. 1982. The sunflower family (Asteraceae) of British Columbia. Vol. I. Senecioneae. B.C. Prov. Mus. Occas. Pap. Ser. No. 23. Victoria, BC. 180 p.

______. 1995. The sunflower family (Asteraceae) of British Columbia. Vol. II - Astereae, Anthemideae, Eupatoreae and Inuleae. Royal B.C. Mus., Victoria, BC. 393 p.

______. 1996. Endemic vascular plants of British Columbia and and adjacent regions. Can. Field-Nat. 110:387-391.

Douglas, G.W., and L.C. Bliss. 1977. Alpine and high subalpine plant communities of the North Cascades Range, Washington and British Columbia. Ecol. Monogr. 47:113-150.

Douglas, G.W., A. Ceska and G.G. Ruyle. 1983. A floristic bibliography for British Columbia. B.C. Minist. For. Land Manage. Rep. No. 15. Victoria, BC.

Douglas, G.W., F. Lomer, and H.L. Roemer. 1998. New or rediscovered native vascular plant species in British Columbia. Can. Field-Nat. 112:276-279.

Douglas, G.W., D. Meidinger and J. Pojar. 1999. Illustrated flora of British Columbia. Vol. 3. Dicotyledons (Diapensiaceae through Onagraceae). Minist. Environ., Lands and Parks, Minist. For., Victoria, BC. 423 p.

______. 1999. Illustrated flora of British Columbia. Vol. 4. Dicotyledons (Orobanchaceae through Rubiaceae). Minist. Environ., Lands and Parks, Minist. For., Victoria, BC. 427 p.

Douglas, G.W., J. Pojar, D. Meidinger, and K. McKeown. 1994. Rare vascular plant collections from the St. Elias Mountains, northwestern British Columbia. Can. Field-Nat. 108:391-396.

Douglas, G.W., G.B. Straley, and D. Meidinger. 1989. The vascular plants of British Columbia. Part 1 - Gymnosperms and Dicotyledons (Aceraceae through Cucurbitaceae). Special Rep. Ser. 1. B.C. Minist. For., Victoria, BC.

______. 1990. The vascular plants of British Columbia. Part 2 – Dicotyledons (Diapensiaceae through Portulacaceae). Special Rep. Ser. 2. B.C. Minist. For., Victoria, BC.

______. 1991. The vascular plants of British Columbia. Part 3 – Dicotyledons (Primulaceae through Zygophylaceae) and Pteridophytes. Special Rep. Ser. 3. B.C. Minist. For., Victoria, BC.

______. 1994. The vascular plants of British Columbia. Part 4 – Monocotyledons. Special Rep. Ser. 4. B.C. Minist. For., Victoria, BC.

______. 1998. Rare native vascular plants of British Columbia. B.C. Conservation Data Centre, Minist. Environ., Lands and Parks, Victoria, BC. 423 p.

Douglas, G.W., G.B. Straley, D. Meidinger and J. Pojar. 1998. Illustrated flora of British Columbia. Vol. 1. Gymnosperms and Dicotyledons (Aceraceae through Asteraceae). Minist. Environ., Lands and Parks, B.C. Minist. For., Victoria, BC. 436 p.

______. 1998. Illustrated flora of British Columbia. Vol. 2. Dicotyledons (Balsaminaceae through Cucurbitaceae). Minist. Environ., Lands and Parks, B.C. Minist. For., Victoria, BC. 401 p.

Eastham, J.W. 1947. Supplement to the flora of southern British Columbia. B.C. Prov. Mus. Spec. Publ. No. 1. Victoria, BC. 119 p.

Fernald, M.L. 1950. Gray's manual of Botany. 8th ed. American Book Co., New York, NY. 1632 p.

Ferris, R.S. 1960. Illustrated Flora of the Pacific States: Washington, Oregon and California. Vol. IV. Bignoniaceae to Compositae. Stanford Univ. Press, Stanford, CA.

Flora of North America Editorial Committee. 1993-1997. Pages 228-245 *in* Flora of North America North of Mexico – Volume 3. Magnoliophyta: Magnoliidae and Hamamelidae. Oxford Univ. Press Inc. New York, NY.

Franklin, F.J., and C.T. Dyrness. 1973. Natural vegetation of Oregon and Washington. U.S.D.A. For. Serv. Gen. Tech. Rep. PNW-8.

Frankton, C., and G.A. Mulligan. 1970. Weeds of Canada. Rev. ed. Can. Dep. Agric. Publ. 948. Queen's Printer, Ottawa, ON. 217 p.

Gray, A. 1884. Caprifoliaceae to Compositae. *In* Synoptical flora of North America. Vol. 1. Amer. Book Co., New York, NY.

Groh, H. 1946. Canadian weed survey. Third Annual Report. Can. Dep. Agric., Ottawa, ON.

Henry, J.K. 1915. Flora of southern British Columbia. W.J. Gage and Co. Ltd., Toronto, ON. 363 p.

Hickman, J.C. 1993. The Jepson manual: Higher plants of California. Univ. Calif. Press, Los Angeles, CA. 1400 p.

Hitchcock, C.L., and A. Cronquist. 1973. Flora of the Pacific Northwest. Univ. Wash. Press, Seattle, WA. 730 p.

Hitchcock, C.L., A. Cronquist, M. Ownbey and J.W. Thomson. 1955-1969. Vascular plants of the Pacific Northwest. Parts 1-5. Univ. Washington Press, Seattle, WA.

Hosie, R.C. 1969. Native trees of Canada. 7th ed. Can. For. Serv., Dep. Environ. Queen's Printer, Ottawa, ON. 380 p.

Hultén, E. 1968. Flora of Alaska and neighboring territories. Stanford Univ. Press, Stanford, CA. 1008 p.

Kartesz, J.T. and C.A. Meacham. 1999. Digital Floristic Synthesis of North America North of Mexico. Published for the Biota of North America Program of the North Carolina Botanical Garden. Patricia Ledlie Bookseller, Inc. Buckfield, MA.

Krajina, V. 1965. Biogeoclimatic zones and classification of British Columbia. Ecol. West. N. Amer. 1:1-17.

_____. 1969. Ecology of forest trees in British Columbia. Ecol. West. N. Amer. 2:1-146.

_____. 1975. Some observations on the subalpine biogeoclimatic zones in British Columbia. Phytocoenologica 2:396-400.

Lomer, F., and G.W. Douglas. 1998. Additions to the flora of the Queen Charlotte Islands. Canadian Field-Nat. 113:235-240.

Löve, D. 1970. Subarctic and subalpine: where and what? Arct. Alp. Res. 2:63-73.

MacKinnon, A., J. Pojar, and R. Coupé. 1992. Plants of Northern British Columbia. Lone Pine Publishing. Edmonton, AB. 351 p.

Macoun, J. 1883-1890. Catalogue of Canadian plants. Parts 1-5. Geol. Surv. Can., Ottawa, ON.

Macoun, J.M. 1889. Checklist of Canadian plants. Cunningham and Lindsay, Ottawa, ON.

_____. 1894-1906. Contributions to Canadian botany. Parts 1-18. Ottawa Field-Nat., Ottawa, ON.

Meusel, H., E. Jager and E. Weinert. 1965. Vergleichende chorologie der zentraleuropaischen flora. I. Gustav. Fischer, Jena.

Packer, J.G. 1983. Flora of Alberta. Second Edition. Univ. Toronto Press, Toronto, ON. 687 p.

Parish, R., R. Coupé, and D. Lloyd. 1996. Plants of Southern Interior British Columbia. Lone Pine Publishing. Vancouver, BC. 463 p.

Pojar, J., and A. MacKinnon. 1994. Plants of Coastal British Columbia. Lone Pine Publishing. Vancouver, BC. 527 p.

Porsild, A.E., and W.J. Cody. 1980. Vascular plants of continental Northwest Territories, Canada. Natl. Mus. Can., Ottawa, ON. 667 p.

Rowe, J.S. 1959. Forest regions of Canada. Can. Dep. North. Affairs Nat. Resour. For. Branch Bull. 123.

_____. 1972. Forest regions of Canada. Can. For. Serv. Publ. 1300.

Rydberg, P.A. 1922. Flora of the Rocky Mountains and adjacent plains. 2nd ed. P.A. Rydberg, New York, NY. 1143 p.

Scoggan, H.J. 1978-79. The flora of Canada. Parts 1-4. Natl. Mus. Nat. Sci. Publ. Bot., No. 7:1-1626.

Straley, G.B., R.L. Taylor and G.W. Douglas. 1985. The rare vascular plants of British Columbia. Natl. Mus. Can. Syllogeus 59, Ottawa, ON.

Szczawinski, A.F. 1959. The orchids of British Columbia. B.C. Prov. Mus. Handb. 16. Victoria, BC. 124 p.

_____. 1962. The heather family (Ericaceae) of British Columbia. B.C. Prov. Mus. Handb. 10. Victoria, BC. 205 p.

Szczawinski, A.F. and A.S. Harrison. 1973. Flora of the Saanich Peninsula. B.C. Prov. Mus. Occas. Pap. Ser. No. 16. Victoria, BC.

Taylor, R.L. and B. MacBryde. 1977. Vascular plants of British Columbia. Bot. Gard. Tech. Bull. No. 4. Univ. B.C. Press, Vancouver, BC. 754 p.

Taylor, T.M.C. 1963. The ferns and fern allies of British Columbia. B.C. Prov. Mus. Handb. 12. Victoria, BC. 172 p.

______. 1966. The lily family (Liliaceae) of British Columbia. B.C. Prov. Mus. Handb. 25, Victoria, BC. 109 p.

______. 1970. Pacific Northwest ferns and their allies. Univ. Toronto Press, Toronto, ON. 247 p.

______. 1973. The rose family (Rosaceae) of British Columbia. B.C. Prov. Mus. Handb. 30. Victoria, BC. 223 p.

______. 1974a. The pea family (Leguminosae) of British Columbia. B.C. Prov. Mus. Handb. 32. Victoria, BC. 251 p.

______. 1974b. The figwort family (Scrophulariaceae) of British Columbia. B.C. Prov. Mus. Handb. 33. Victoria, BC. 237 p.

______. 1983. The sedge family (Cyperaceae). B.C. Prov. Mus. Handb. 43. Victoria, BC. 375 p.

Tutin, T.G., V.H. Heywood, N.A. Burges, D.M. Moore, D.H. Valentine, S.M. Walters and D.A. Webb. [eds.]. 1964-1980. Flora Europaea. Volumes 1-5. Univ. Cambridge Press, Cambridge, MA.

Ulke, T.A. 1935. List of the vascular plants of the Horsethief Creek – Purcell Range, B.C. Can. Field-Nat. 49:49-55, 71-76.

Welsh, S.L. 1974. Anderson's flora of Alaska and adjacent parts of Canada. Brigham Young Univ. Press, Provo, UT. 724 p.

SALICACEAE

Argus, G.W. 1965. An endemic subspecies of *Salix reticulata* L. from the Queen Charlotte Islands, British Columbia. Can. J. Bot. 43:1021-1024.

______. 1965. The taxonomy of the *Salix glauca* complex in North America. Contrib. Gray Herb., Harvard Univ. 196. 142 p.

______. 1973. The genus *Salix* in Alaska and the Yukon. Natl. Mus. Nat. Sci. Pub. Bot. No. 2. Nat. Mus. Can., Ottawa, ON. 279 p.

______. 1983. *Salix*. *In* J.G. Packer, ed. Flora of Alberta. Second Edition. Univ. Toronto Press, Toronto, ON.

______. 1986. *Salix raupii*, Raup's willow, new to the flora of Alberta and the Northwest Territories. Can. Field-Nat. 100:386-388.

______. 1986. The *Salix lucida* Muhl. and *S. reticulata* L. complexes in North America. Can. J. Bot. 64:541-551

______. 1986. The genus *Salix* (Salicaceae) in the Southeastern United States. Syst. Bot. Monogr. No. 9.

______. 1993. *Salix*. Pages 990-1001 *in* J.C. Hickman, ed. The Jepson manual: Higher plants of California. University of California Press. Berkeley, CA.

Argus G.W., and T.C. Brayshaw. 1987. Noteworthy records, British Columbia. *Salix tweedyi*. Madroño 34:268.

Brayshaw, T.C. 1965. The status of the black cottonwood (*Populus trichocarpa* Torrey and Gray). Can. Field-Nat. 79:91-95.

______. 1976. Catkin bearing plants of British Columbia. B.C. Prov. Mus. Occas. Pap. Ser. No. 18. Victoria, BC. 176 p.

Brunsfeld, S.J., and F.D. Johnson. 1985. Field guide to the willows of east-central Idaho. Univ. Idaho, College of Forestry, Wildlife and Range Sciences. Bull. 39.

Cronquist, A. 1964. *Salix*. *In* C.L. Hitchcock *et al*., eds. Vascular Plants of the Pacific Northwest. Part 2. Univ. Washington Press, Seattle, WA.

Dorn, R.D. 1975. A systematic study of *Salix* section *Cordatae* in North America. Can J. Bot. 53:1491-1522.

______. 1977. Willows of the Rocky Mountain States. Rhodora 79:390-429.

Eckenwalder, E. 1977. North American cottonwoods (*Populus, Salicaceae*) of sections Abaso and Aigeir. J. Arnold Arb. 58:193-208.

Meikle, R.D. 1984. Willows and poplars of Great Britain and Ireland. Bot. Soc. British Isles Handb. No. 4.

Moss, E.H. 1959. Flora of Alberta. Univ. Toronto Press, Toronto, ON.

Viereck, L.A. and E.L. Little, Jr. 1972. Alaska trees and shrubs. U.S. Dep. Agric., For. Ser. Agric. Handb. No. 410.

SANTALACEAE

Piehl, M.A. 1965. The natural history and taxonomy of *Comandra* (Santalaceae). Mem. Torrey Bot. Club 22:1-97.

SARRACENIACEAE

Cody, W.J., and S.S. Talbot. 1973. The pitcher plant *Sarracenia purpurea* L. in the northwestern part of its range. Can. Field-Nat. 87:318-320.

Krajina, V.J. 1968. Sarraceniaceae, a new family for British Columbia. Syesis 1:121-124.

Wherry, E.T. 1933. The geographic relations of *Sarracenia purpurea*. Bartonia 15:1-6.

SAXIFRAGAGEAE

Bohm, B.A. 1979. Flavonoids of *Tolmiea menziesii*. Phytochemistry 18:1079-1080.

Bohm, B.A., and C.K. Wilkins. 1978. Chemosystematic studies in the Saxifragaceae *sensu lato*. 8. The Flavonoids of *Elmera racemosa* (Watson) Rydberg. Brittonia 30:327-333.

Calder, J.A. 1959. Studies in the Saxifragaceae, II. *Saxifraga* sect. *Trachyphyllum* in North America. Brittonia 11:228-249.

______. 1960. Studies in the Saxifragaceae, III. *Saxifraga odontoloma* and *lyallii*, and North American subspecies of *S. punctata*. Can. J. Bot. 38:410-435.

Calder, J.A., and D.B.O. Savile. 1959. Studies in the Saxifragaceae, I. The *Heuchera cylindrica* complex in and adjacent to British Columbia. Brittonia 11:49-67.

Ceska, A. 1975. Additions to the adventive flora of Vancouver Island, British Columbia. Can. Field-Nat. 89:451-502.

Clement, C.J.E. 1987. Marsh Saxifrage, *Saxifraga hirculus*, and Diapensia, *Diapensia lapponica*, in northern British Columbia. Can. Field-Nat. 101:443-445.

Elvander, P.E. 1972. Taxonomy of *Saxifraga occidentalis* and *S. marshallii*. Can. J. Bot. 50:2131-2141.

______. 1984. The taxonomy of *Saxifraga* (Saxifragaceae) Section *Boraphila* Subsection *Integrifoliae* in western North America. Syst. Bot. Mongr. 3:1-44.

Gornall, R.J. 1985. A monograph of *Boykinia*, *Peltoboykinia*, *Bolandra*, and *Suksdorfia* (Saxifragaceae). J. Linn. Soc. Bot. 90:1-70.

Gornall, R.J., and B.A. Bohm. 1980. The use of flavonoids in the taxonomy of *Boykinia* and allies (Saxifragaceae). Can. J. Bot. 58:1768-1779.

Kern, P. 1966. The genus *Tiarella* in western North America. Madroño 8:152-159.

Krause, D.L., and K.I. Beamish. 1973. Notes on *Saxifraga occidentalis* and closely related species. Syesis 6:104-114.

Packer, J.G. 1963. The taxonomy of some North American species of *Chrysosplenium* L., section *Alternifolia* Franchet. Can. J. Bot. 41:85-103.

______. 1991. Saxifragaceae. *In* G.W. Douglas *et al.*, eds. The Vascular Plants of British Columbia. Part 3 - Dicotyledons (Primulaceae through Zygophyllaceae) and Pteridophytes. Special Rep. Ser. 3. B.C. Minist. For., Victoria, BC.

Perkins, W.E. 1987. Systematics of *Saxifraga rufidula* and related species from the Columbia River Gorge to southwestern British Columbia. Ph.D. thesis, Univ. B.C., Vancouver, BC.

Randhawa, A.S. 1972. The distribution of *Saxifraga ferruginea* and the problem of refugia in northwestern North America. Can. J. Bot. 50:79-87.

Randhawa, A.S., and K.I Beamish. 1970. Observations on the morphology, anatomy, classification and reproductive cycle of *Saxifraga ferruginea*. Can. J. Bot. 48:299-312.

Savile, D.B.O. 1973. Vegetative distinctions in Canadian species of *Mitella* and *Tiarella*. Can. Field-Nat. 87:460-462.

Skelly, R.J. 1988. A new species of *Saxifraga* (Saxifragaceae) from the Olympic Mountains, Washington, and Vancouver Island, British Columbia. Madroño 35:126-131.

Soltis, D.E. 1984. Autopolyploidy in *Tolmiea menziesii* (Saxifragaceae). Amer. J. Bot. 71:1171-1174.

______. 1984. Karyotypic relationships among *Elmera*, *Heuchera* and *Tellima* (Saxifragaceae). Syst. Bot. 9:6-11.

Soltis, D.E., and B.A. Bohm. 1986. Flavonoid chemistry of diploid and tetraploid cytotypes of *Tolmiea menziesii* (Saxifragaceae). Syst. Bot. 11:20-25.

Soltis, D.E., and L.H. Riesenberg. 1986. Autopolyploidy in *Tolmiea menziesii* (Saxifragaceae): genetic insights from enzyme electrophoresis. Amer. J. Bot. 73:310-318.

Soltis, P.S., and D.E. Soltis. 1986. Anthocyanin content in diploid and tetraploid cytotypes of *Tolmiea menziesii* (Saxifragaceae). Syst. Bot. 11:32-34.

Taylor, R.J. 1971. Biosystematics of the genus *Tiarella* in the Washington Cascades. Northwest Sci. 45:27-37.

______. 1965. The genus *Lithophragma* (Saxifragaceae). Univ. Calif. Publ. Bot. 37:1-89.

Wells, E. F. 1984. A revision of the genus *Heuchera* (Saxifragaceae) in eastern North America. Syst. Bot. Monogr. 3:45-121.

SCROPHULARIACEAE

Alex, J.F. 1962. The taxonomy, history and distribution of *Linaria dalmatica*. Can. J. Bot. 40:295-307.

Boivin, B. 1952. Quelques *Veronica* du Canada. Nat. Can. 79:173-176.

Callen, E.O. 1940. Part 1. Studies in the genus *Euphrasia* L. J. Bot. 78:213-218.

______. 1952. Part 3. Studies in the genus *Euphrasia* L. Rhodora 54:145-156.

Cantelon, J.E., E.J. Curtis and W.M. Malcolm. 1963. Studies on *Melampyrum lineare*. Ecology 44:466-474.

Chuang, T.I. and L.R. Heckard. 1993. *Castilleja*. *In* J.C. Hickman, ed. The Jepson manual: Higher plants of California. Univ. Calif. Press. Berkeley, CA. 1016-1024 p.

Crosswhite, F.S. 1967. Revision of *Penstemon* section Habroanthus (Scrophulariaceae) I. Conspectus. Amer. Midl. Nat. 77:1-11.

______. 1967. Revision of *Penstemon* section Habroanthus (Scrophulariaceae) II. Ser. Speciosi. Amer. Midl. Nat. 77:12-27.

______. 1967. Revision of *Penstemon* section Habroanthus (Scrophulariaceae) III. Ser. Virgati. Amer. Midl. Nat. 77:28-41.

Douglas, D. 1973. Root parasitism in *Castilleja rhexifolia*. Arct. Alp. Res. 5:145-147.

Douglas, G.W., and M. Ryan. 1999. Status of the Golden Paintbrush, *Castilleja levisecta* (Scrophulariaceae) in Canada. Can. Field-Nat. 113:299-301.

Fernald, M.L., and K.M. Wiegand. 1915. The genus *Euphrasia* in North America. Rhodora 17:181-201.

Ganders, F.R. 1966. Occurrence of the genus *Euphrasia* in the Pacific Northwest. Madroño 18:160.

Grant, A.L. 1924. A monograph of the genus *Mimulus*. Ann. Missouri Bot. Gard. 11:99-389.

Griffiths, A.J.F., G. Krause and F.R. Ganders. 1977. A leaf spot polymorphism in *Collinsia grandiflora* (Scrophulariaceae). Can. J. Bot. 55:654-661.

Heckard, L.R. 1962. Root parasitism in *Castilleja*. Bot. Gaz. 124:21-29.

Hiesey, W.M., M.A. Nobs and O. Bjorkmann. 1971. Experimental studies on the nature of species. V. Biosystematics, genetics, and physiological ecology of the *Eryanthe* section of *Mimulus*. Carnegie Inst. Wash. Publ. 628. 213 p.

Holmgren, N.H. 1971. A taxonomic revision of the *Castilleja viscidula* group. Mem. New York Bot. Gard. 21(4):1-63.

______. 1973a. *Castilleja*. *In* C.L. Hitchcock and A. Cronquist, eds. Flora of the Pacific Northwest. Univ. Wash. Press, Seattle, WA.

______. 1973b. Five new species of *Castilleja* (Scrophulariaceae) from the Intermountain region. Bull. Torrey Bot. Club 100:83-93.

Hulten, E. 1958. The amphi-Atlantic plants and their phytogeographical connections. Kongl. Svenska Vetenskapsakad. Handl. Ser. 4. 7:1-340.

______. 1961. Two *Pedicularis* species from N.W. America, *P. albertae n. sp.* and *P. sudetica sensu lat.* Sven. Bot. Tidskr. 55:193-204.

Keck, D.D. 1927. A revision of the genus *Orthocarpus*. Proc. Calif. Acad. Sci. IV. 16:517-571.

______. 1945. Studies in *Penstemon*-VIII: A cytotaxonomic account of the section Spermunculus. Amer. Midl. Nat. 33:128-206.

Keck, D.D., and A. Cronquist. 1957. Studies in *Penstemon* – IX: Notes on northwestern American species. Brittonia 8:247-250.

Pennell, F.W. 1921. *Veronica* in North and South America. Rhodora 23:1-22, 29-41.

______. 1934. *Castilleja* in Alaska and northwestern Canada. Proc. Acad. Phila. 86:517-540.

Penny, J.L., G.W. Douglas and G.A. Allen. 1998. Status of the Bearded Owl-clover, *Triphysaria versicolor* ssp. *versicolor* (Scrophulariaceae) in Canada. Can. Field-Nat. 112:481-485.

Sell, P.D., and P.F. Yeo. 1962. Some new North American eyebrights (*Euphrasia*). Regnum Veg. 64:202-203.

Straw, R.M. 1966. A redefinition of *Penstemon* (Scrophulariaceae). Brittonia 18:80-95.

Taylor, T.M.C. 1974. The figwort family (Scrophulariaceae) of British Columbia. B.C. Prov. Mus. Handb. No. 33. Victoria, BC. 237 p.

SOLANACEAE

Goodspeed, T.H. 1945. Studies in *Nicotiana* III. A taxonomic organization of the genus. Univ. Calif. Publ. Bot. 18:335-344.

Stebbins, G.L., Jr., and E.F. Paddock. 1949. The *Solanum nigrum* complex in Pacific North America. Madroño 10:70-81.

Waterfall, U.T. 1958. A taxonomic study of the genus *Physalis* in North America north of Mexico. Rhodora 60:107-114, 128-142, 152-173.

URTICACEAE

Bassett, I.J., C.W. Crompton and D.W. Woodland. 1974. The family Urticaceae in Canada. Can. J. Bot. 52:503-516.

Boufford, D.E. 1997. Urticaceae. *In* Flora of North America Editorial Committee, eds. Flora of North America North of Mexico – Volume 3. Magnoliophyta: Magnoliidae and Hamamelidae. Oxford Univ. Press Inc. New York, NY.

Hermann, F.J. 1946. The perennial species of *Urtica* in the United States east of the Rocky Mountains. Amer. Midl. Nat. 35:773-778.

VALERIANACEAE

Dempster, L.T. 1958. Valerianaceae. Dimorphism in the fruits of *Plectritis* and its taxonomic implications. Brittonia 10:14-28.

VERBENACEAE

Lewis, W.H., and R.J. Oliver. 1961. Cytogeography and phylogeny of the North American *Verbena*. Amer. J. Bot. 48:638-643.

Perry, L.M. 1933. A revision of the North American species of *Verbena*. Ann. Missouri Bot. Gard. 20:239-358.

VIOLACEAE

Baird, V.B. 1941. Wild violets of North America. Univ. Calif. Press. Berkeley, CA. 225 p.

Baker, M.S. 1935. Studies in western violets. I. Madroño 3:51-57.

______. 1936. Studies in western violets. II. Madroño 3:321-239.

______. 1940. Studies in western violets. III. Madroño 5:218-231.

______. 1949. Studies in western violets. VI. Madroño 10:110-128.

______. 1953. Studies in western violets. VII. Madroño 12:8-18.

______. 1957. Studies in western violets. VIII. The *Nuttalianae* continued. Brittonia 9:217-230.

Brainerd, E. 1905. Notes on New England violets, – III. Rhodora 7:245-248.

______. 1921. Violets of North America. Vermont Agric. Exp. Sta. Bull.No. 224. Burlington, VT.

Clausen, J. 1964. Cytotaxonomy and distributional ecology of western North American violets. Madroño 17:173-197.

Douglas, G.W. and M. Ryan. 1998. Status of the Yellow Montane Violet, *Viola praemorsa* ssp. *praemorsa* (Violaceae) in Canada. Can. Field-Nat. 112:280-283.

Fabijan, D.M., J.G. Packer and K.E. Denford. 1987. The taxonomy of the *Viola nuttallii* complex. Can. J. Bot. 65:2562-2580.

Harms, V.L., D.F. Hooper and L. Baker. 1985. Four violets new to the Saskatchewan flora and other rare violets of east-central Saskatchewan. Can. Field-Nat. 99:498-502.

McPherson, G.D., and J.G. Packer. 1974. A contribution to the taxonomy of *Viola adunca*. Can. J. Bot. 52:985-902.

Packer, J.G. 1991. Violaceae. *In* G.W. Douglas *et al.*, eds. The Vascular Plants of British Columbia. Part 3 - Dicotyledons (Primulaceae through Zygophyllaceae) and Pteridophytes. Special Rep. Ser. 3. B.C. Minist. For., Victoria, BC.

Russell, N.H. 1955. The taxonomy of the North American acaulescent white violets. Amer. Midl. Nat. 54:481-494.

______. 1956. Regional variation patterns in the stemless white violets. Amer. Midl. Nat. 56:491-503.

Russell, N.H., and F.S. Crosswhite. 1963. An analysis of variation in *Viola nephrophylla*. Madroño 17:56-65.

Sorsa, M. 1968. Cytological and evolutionary studies in Palustres violets. Madroño 19:165-179.

VISCACEAE

Hawksworth, F.G., and D.P. Graham. 1963. Dwarf mistletoes on spruce in the western United States. Northwest Sci. 37:31-38.

Hawksworth, F.G., and D. Wiens. 1972. Biology and classification of dwarf mistletoes (*Arceuthobium*). U.S. Dep. Agric. Agric. Handb. 401. 234 p.

______. 1993. Viscaceae. Pages 1016-1024 *in* J.C. Hickman, ed. The Jepson manual: Higher plants of California. Univ. Calif. Press, Berkeley, CA.

Kuijt, J. 1955. Dwarf mistletoes. Bot. Rev. 21:569-619.

______. 1963. Distribution of dwarf mistletoes and their fungus hyperparasites in western Canada. Natl. Mus. Can. Bull. 186:134-148.

PTERIDOPHYTA

Cody, W.J., and D.M. Britton. 1989. Ferns and fern allies of Canada. Agric. Can. Res. Branch, Publ. 1829/E. Ottawa, ON. 430 p.

Lellinger, D.B. 1985. A field manual of the ferns and fern-allies of the United States and Canada. Smithsonian Inst. Press, Washington, DC. 389 p.

Page, C.N. 1982. The ferns of Britain and Ireland. Cambridge University Press, Cambridge, England. 447 p.

Taylor, T.M.C. 1963. The ferns and fern allies of British Columbia. B.C. Prov. Mus. Handb. 12. Victoria, BC. 172 p.

______. 1970. Pacific Northwest ferns and their allies. Univ. Toronto Press, Toronto, ON. 247 p.

EQUISETACEAE

Cody, W.J., and V. Wagner. 1981. The biology of Canadian weeds. 49: *Equisetum arvense* L. Can. J. Plant Sci. 61:123-133.

Hauke, R. 1963. A taxonomic monograph of the genus *Equisetum* subgenus Hippochaeta. Beih. Nova Hedwigia 8:1-123.

Hauke, R.L. 1960. The smooth scouring rush and its complexities. Amer. Fern J. 50:185-193.

______. 1966. A systematic study of *Equisetum arvense*. Beih. Nova Hedwigia 13:81-109.

______. 1974. The taxonomy of *Equisetum*:an overview. New Bot. 1:89-95.

______. 1978. A taxonomic monograph of *Equisetum* subgenus *Equisetum*. Nova Hedwigia 30:385-455.

ISOETACEAE

Fuchs, H.P. 1962. Nomenklatur, Taxonomie und Systematik der Gattung *Isoetes* Linnaeus in geschichtlicher Betrachtung. Beih. Nova Hedwigia 3:1-103.

Pfeiffer, N.E. 1922. Monograph of the Isoetaceae. Ann. Missouri Bot. Gard. 9:79-232.

LYCOPODIACEAE

Hickey, R.J. 1977. The *Lycopodium obscurum* complex in North America. Amer. Fern J. 67:45-48.

Wilce, J.H. 1965. Section *Complanata* of the genus *Lycopodium*. Beih. Nova Hedwigia 19:1-233; 40 plates.

SELAGINELLACEAE

Tryon, R.M. Jr. 1955. *Selaginella rupestris* and its allies. Ann. Missouri Bot. Gard. 42:1-99.

OPHIOGLOSSACEAE

Clausen, R.T. 1938. A monograph of the Ophioglossaceae. Mem. Torrey Bot. Club 19:1-177.

Wagner, W.H., Jr. and F.S. Wagner. 1981. New species of moonworts, *Botrychium* subgen. *Botrychium* (Ophioglossaceae), from North America. Amer. Fern J. 71:20-30.

______. 1983. Two moonworts of the Rocky Mountains: *Botrychium hesperium* and a new species formerly confused with it. Amer. Fern J. 73:53-62.

______. 1986. Three new species of moonworts, *Botrychium* subgen. *Botrychium*, endemic in western North America. Amer. Fern J. 76:33-47.

______. 1993. Ophioglossaceae. Pages 85-106 *in* Flora of North America Editorial Committee, eds. Flora of North America North of Mexico - Volume 3. Magnoliophyta: Magnoliidae and Hamamelidae. Oxford Univ. Press Inc. New York, NY.

Wagner, W.H., Jr. and L.P. Lord. 1956. The morphological and cytological distinctness of *Botrychium minganense* and *B. lunaria* in Michigan. Bull. Torrey Bot. Club 83:261-281.

ASPLENIACEAE

Gibby. 1998. The origins, status and distribution of *Asplenium presolanense* sp. nov. (Aspleniaceae, Pteriodophyta). Botanica Helvetica 108:269-288.

Mokry, F., H. Rasbach and T. Reichstein. 1986. *Asplenium adulterinum* Milde subsp. *presolanense* subsp. nova (Aspleniaceae, Pteridophyta). Botanica Helvetica 96:7-18.

Moran, R.C. 1982. The *Asplenium trichomanes* complex in the United States and adjacent Canada. Amer. Fern J. 72:5-11.

Vogel, J.C., F.J. Rumsey, J.J. Schneller, S.J. Russell, J.S. Holmes, J.A. Barrett, and M. Gibby. 1998. The origins, status and distribution of *Asplenium presolanense* sp. nov. (Aspleniaceae, Pteridophyta). Botanica Helvetica 108:269-288.

Wagner, H.W., Jr., R.C. Moran and C.R. Werth. 1993. Aspleniaceae. Pages 228-245 *in* Flora of North America Editorial Committee eds. Flora of North America North of Mexico - Volume 3. Magnoliophyta: Magnoliidae and Hamamelidae. Oxford Univ. Press Inc. New York, NY.

Zimmer, B., and W. Greuter. 1994. (1093) Proposal to reject the name *Asplenium ramosum* L. (Pteridophyta). Taxon 43:303-304.

AZOLLACEAE

Brunton, D.F. 1986. Status of the mosquito fern, *Azolla mexicana* Salviniaceae, in Canada. Can. Field-Nat. 100:404-408.

Svenson, H.K. 1944. The new world species of *Azolla*. Amer. Fern J. 34:69-84.

BLECHNACEAE

Cody, W.J. 1963. *Woodwardia* in Canada. Amer. Fern J. 53:17-27.

Löve, A., and D. Löve. 1966. The variation of *Blechnum spicant*. Bot. Tidskr. 62:186-196.

______. 1968. Cytotaxonomy of *Blechnum spicant*. Collect. Bot. 7:665-676.

DENNSTAEDTIACEAE

Cody, W.J., and C.W. Crompton. 1975. The biology of Canadian weeds: 15. *Pteridium aquilinum* (L.) Kuhn. Can. J. Plant Sci. 55:1059-1072.

Tryon, R.M. 1941. A revision of the genus *Pteridium*. Rhodora 43:1-31, 37-67.

DRYOPTERIDACEAE

Blasdell, R.F. 1963. A monographic study of the fern genus *Cystopteris*. Mem Torrey Bot. Club 21:1-102.

Boivin, B. 1966. Études ptéridologiques. III. Variations du *Woodsia oregana*. Bull. Soc. Bot. France 113:407-409.

Britton, D.M. 1962. *Dryopteris dilatata* (Hoffm.) A.Grey in North America. Rhodora 64:207-212.

______. 1972. Spinulose wood ferns in western North America. Can. Field-Nat. 86:241-247.

______. 1972. Spore ornamentation in the *Dryopteris spinulosa* complex. Can. J. Bot. 50:1617-1621.

Britton, D.M. 1977. The fern *Woodsia obtusa* (Spreng.) Torrey in Ontario. Can. Field-Nat. 91:84-85.

Britton, D.M., and A.C. Jermy. 1974. The spores of *Dryopteris filix-mas* and related taxa in North America. Can. J. Bot. 52:1923-1926.

Brown, D.F.M. 1964. A monographic study of the fern genus *Woodsia*. Nova Hedwigia 16:1-154.

Carlson, T.M., and W.H. Wagner. 1982. The North American distribution of the genus *Dryopteris*. Contrib. Univ. Mich. Herb. 15:141-162.

Cody, W.J., and D.M. Britton. 1984. *Polystichum lemmonii*, a rock shield-fern new to British Columbia and Canada. Can. Field-Nat. 98:375.

Crane, F.W. 1960. A key to American *Dryopteris* based on characters of the perispore. Amer. Fern J. 50:270-275.

Fuchs, H.P. 1974. The correct name of the alpine lady fern. Candollea 29:181-205.

Hagenah, D.J. 1961. Spore studies in the genus *Cystopteris*. I. The distribution of *Cystopteris* with non-spiny spores in North America. Rhodora 63:181-193.

Jamison, J.A., and G.W. Douglas. 1998. Status of the Coastal Wood Fern, *Dryopteris arguta* (Dryopteridaceae) in Canada. Can. Field-Nat. 112:284-288.

Jermy, A.C., and L. Harper. 1971. Spore morphology of the *Cystopteris fragilis* complex. British Fern Gazette 10:211-213.

Maxon, W.R. 1918. *Polystichum andersoni* and related species. Amer. Fern J. 8:33-37.

Prange, R.K., and P. von Aderkas. 1985. The biological flora of Canada 6. *Matteucia struthiopteris* (L.) Todaro, Ostrich Fern. Can. Field-Nat. 99:517-532.

Pryer, K.M. and D.M. Britton. 1983. Spore studies in the genus *Gymnocarpium*. Can. J. Bot. 61:377-388.

Sarvela, J. 1978. A synopsis of the fern genus *Gymnocarpium*. Ann. Bot. Fenn. 15:101-106.

______. 1980. *Gymnocarpium* hybrids from Canada and Alaska. Ann. Bot. Fenn. 17:292-295.

Sarvela, J., D.M. Britton and K. Pryer. 1981. Studies on the *Gymnocarpium robertianum* complex in North America. Rhodora 83:421-431.

Sorsa, P. 1980. Spore morphology of the fern genus *Gymnocarpium* and its relations to the taxonomy. Ann. Bot. Fenn. 17:86-90.

von Aderkas, P. 1983. Studies of gametophytes of *Matteucia struthiopteris* (ostrich fern) in nature and in culture. Can. J. Bot. 61:3267-3270.

______. 1984. Economic history of ostrich fern, *Matteucia struthiopteris*, the edible fiddlehead. Econ. Bot. 38:14-23.

Wagner, D.H. 1979. Systematics of *Polystichum* in western North America north of Mexico. Pteridologia 1:1-64.

______. 1993. *Polystichum*. *In* New taxa and nomenclatural changes in the North American fern flora. Contr. Univ. Michigan Herb. 19:31-61.

Wagner, W.H., Jr. 1973. Reticulation of holly ferns (*Polystichum*) in the western United States and adjacent Canada. Amer. Fern J. 63:99-115.

Widén, C.-J., and D.M. Britton. 1971. A chromatographic and cytological study of *Dryopteris filix-mas* and related taxa in North America. Can. J. Bot. 49:1589-1600.

______. 1971. A chromatographic and cytological study of *Dryopteris dilatata* in North America and eastern Asia. Can. J. Bot. 49:247-258.

______. 1971. A chromatographic and cytological study of *Dryopteris filix-mas* and related taxa in North America. Can. J. Bot. 49:1589-1600.

Windham, M.D. 1993. *Woodsia*. Pages 270-280 *in* Flora of North America Editorial Committee eds. Flora of North America North of Mexico – Volume 3. Magnoliophyta: Magnoliidae and Hamamelidae. Oxford Univ. Press Inc. New York, NY.

HYMENOPHYLLACEAE

Cordes, L.D., and V.J. Krajina. 1968. *Mecodium wrightii* on Vancouver Island. Amer. Fern J. 58:181.

Iwatsuki, I. 1961. The occurrence of *Mecodium wrightii* in Canada. Amer. Fern J. 51:141-144.

Taylor, T.M.C. 1967. *Mecodium wrightii* in British Columbia and Alaska. Amer. Fern J. 57:1-6.

MARSILEACEAE

Johnson, D.M. 1986. Systematics of the New World species of *Marsilea* (Marsileaceae). Syst. Bot. Monogr. 11:1-87.

POLYPODIACEAE

Lang, F.A. 1971. The *Polypodium vulgare* complex in the Pacific Northwest. Madroño 21:235-254.

PTERIDACEAE

Alverson, E.R. 1989. *Cryptogramma cascadensis*, a new parsley-fern from western North America. Amer. Fern J. 79:95-102.

Brunton, D.F. 1979. Taxonomy, distribution, and ecology of the Cliff-brake Ferns (*Pellaea*: Polypodiaceae) in Alberta. Can. Field-Nat. 93:288-295.

______. 1986. Status of the southern maidenhair fern, *Adiantum capillus-veneris* (Adiantaceae) in Canada. Can. Field-Nat. 100:404-408.

Cody, W.J. 1983. *Adiantum pedatum* ssp. *calderi*, a new subspecies in northeastern North America. Rhodora 85:93-96.

Gastony, G.J. 1988. The *Pellaea glabella* complex: electrophoretic evidence for the derivations of the agamosporous taxa and revised taxonomy. Amer. Fern. J. 78:44-67.

Lellinger, D.B. 1968. A note on *Aspidotis*. Amer. Fern J. 58:140-141.

Paris, C.A. 1999. *Adiantum viridimontanum*, a new maidenhair in eastern North America. Rhodora. (in press)

Paris, C.A., and M.D. Windham. 1988. A biosystematic investigation of the *Adiantum pedatum* complex in eastern North America. Syst. Bot. 13:240-255.

Rigby, S.J., and D.M. Britton. 1970. The distribution of *Pellaea* in Canada. Can. Field-Nat. 84:137-144.

Smith, A.R. 1975. The California species of *Aspidotis*. Madroño 23:15-24.

Smith, D.M., S.P. Craig, and J. Santarosa. 1971. Cytological and chemical variation in *Pityrogramma triangularis*. Amer. J. Bot. 58:292-299.

Tryon, A.F. 1957. A revision of the fern genus *Pellaea* section *Pellaea*. Ann. Missouri Bot. Gard. 44:125-193.

______. 1972. Spores, chromosomes and relations of the fern *Pellaea atropurpurea* .Rhodora 74:220-241.

Tryon, A.F., and D.M. Britton. 1958. Cytotaxonomic studies of the fern genus *Pellaea*. Evolution 12:137-145.

Wagner, W.H., Jr. and K.E. Boydston. 1978. A dwarf coastal variety of maidenhair fern, *Adiantum pedatum*. Can. J. Bot. 56:1726-1729.

Weatherby, C.A. 1920. Varieties of *Pityrogramma triangularis*. Rhodora 22:113-120.

Windham, M.D. 1993a. New taxa and nomenclatural changes in the North American fern flora. Contr. Univ. Michigan Herb. 19:31-61.

Windham, M.D. 1993b. *Pellaea*. *In* Flora of North American Editorial Committee, eds. Flora of North America north of Mexico. Vol. 2. Oxford Univ. Press, New York, NY. 475 p.

Yatskievych, G., M.D. Windham and E. Wollenweber. 1990. A reconsideration of the genus *Pityrogramma* Link (Adiantaceae) in the southwestern United States. Amer. Fern J. 80:9-17.

THELYPTERIDACEAE

Mulligan, G.A., and W.J. Cody. 1979. Chromosome numbers in Canadian *Phegopteris*. Can. J. Bot. 57:1815-1819.

Smith, A.R. 1971. Chromosome numbers of some New World species of *Thelypteris*. Brittonia 23:354-360.

APPENDIX I - EXCLUDED SPECIES

SALICACEAE

Populus alba **L.** Cultivated in British Columbia but not naturalized.

Populus grandidenta. Cultivated in British Columbia but not naturalized.

Populus nigra **L. var.** ***italica*** **DuRoi.** Cultivated in British Columbia but not naturalized.

Salix cordata **Muhl.** ***non*** **Michx.** This name, a synonym of the eastern American *S. eriocephala* Michx., was used by Henry (1915). He was probably referring to *S. prolixa*.

Salix fluviatilis **Nutt.** This species, reported by Henry (1915), is unconfirmed for BC. Its taxonomic status is also uncertain.

Salix lasiolepis **Benth.** Reported for Hazelton by Cronquist (1964) and repeated by Taylor and MacBryde (1977). No specimens from BC have been located.

SAXIFRAGACEAE

Chrysosplenium glechomaefolium **Nutt.** ***ex*** **T.& G.** This species of the US west coast, first reported by Henry (1915) and taken up by Hitchcock *et al.* (1961) and Taylor and MacBryde (1977), does not occur in BC.

Saxifraga aizoon **Jacq.** Cited by Scoggan (1978) but no BC material available.

Saxifraga foliolosa **R. Br.** Reported by Taylor and MacBryde (1977) but no material seen.

Saxifraga radiata **Small.** This species, reported by Taylor and MacBryde (1977), is not part of our flora.

Saxifraga rhomboidea **Greene.** Cited for BC by Hitchcock *et al.* (1961) and Scoggan (1978) but not occurring in our range.

SCROPHULARIACEAE

Antirrhinum majus **L.** Cited by Taylor and MacBryde (1977), this garden escape is not established in our region.

Besseya rubra **(Dougl.** ***ex*** **Hook.) Rydb.** The report of this species from SE BC (Henry 1915) was probably based upon *B. wyomingensis*.

Castilleja flava **S. Wats.** Cited by Scoggan (1979) but no good BC material seen of this US species.

Castilleja fulva **Pennel.** This species, part of a confusing and little studied complex, has not been collected in BC since 1940.

Castilleja pallescens **(A. Gray) Greenm.** All BC material has been reidentified as other species.

Digitalis ambigua **Murr.** (*D. grandiflora* P. Mill.). This garden escape, reported for BC by Scoggan (1978) is not established in our area. It is known from a single 1954 collection at Aldergrove.

Digitalis lanata **Ehrh.** Scoggan (1979) cited a single 1954 collection from Sooke. This garden escape does not persist in our region.

Euphrasia mollis **(Ledeb.) Wettst.** The report of this species in N BC (Rydberg 1922) has not been substantiated.

Kickxia spuria **(L.) Dumort.** Cited by Eastham (1947) and Scoggan (1978) but known from only a single collection at Duncan.

Limosella subulata **Ives.** Reports of this species Taylor (1974), Taylor and MacBryde (1977) are based on misidentifications of *L. aquatica* (Straley *et al.* 1985).

Linaria macroccana **Hook. f.** Cited by Taylor and MacBryde (1977), but no BC material seen.

Linaria pinifolia **(Poir.) Thell.** (*L. reticulata* [Sm.] Desf.). The only report of this species from BC (Groh and Frankton 1949) is now over 40 years old and no recent material is available.

***Mimulus suksdorfii* A. Gray** This species of the W US, reported for BC by Rydberg (1922), does not extend into our region.

***Misopates orontium* (L.) Raf.** (*Antirrhinum orontium* L.) Cited by Taylor and MacBryde (1977), but no material seen.

***Orthocarpus purpureus* Benth.** Cited by Eastham (1947) from the Victoria area but neither this collection nor any other seen.

***Penstemon attenuatus* Dougl. *ex* Lindl.** Cited in Taylor (1974) and Taylor & MacBryde (1977), but probably based on misidentifications of *P. albertinus*.

***Penstemon cusickii* A. Gray.** The only BC collection identified as this species has been reidentified.

***Penstemon deustus* Dougl. *ex* Lindl.** Cited in Henry (1915), but no specimens known.

***Penstemon montanus* Greene.** Cited in Straley *et al.* (1985), but probably based on misidentifications of *P. ellipticus*.

***Penstemon triphyllus* Dougl. *ex* Lindl.** Cited in Rydberg (1922), but no specimens known.

***Penstemon venustus* Dougl. *ex* Lindl.** Cited in Macoun (1884), but this was based on *P. lyallii*.

***Triphysaria eriantha* (Benth.) Heckard** (*Orthocarpus erianthus* Benth). This collection by J. Macoun in 1908 at Victoria (Scoggan 1979), has been reidentified as *Triphysaria versicolor* ssp. *versicolor*.

***Veronica agrestis* L.** Cited in Henry (1915), but no recent records known.

SIMAROUBACEAE

***Ailanthus altissima* (P. Mill.) Swingle.** This horticultural species, cited by Taylor and MacBryde (1977), does not persist in our region.

SOLANACEAE

***Hyoscyamus niger* L.** This species, last collected in 1923, does not persist in BC.

***Lycopersicon esculentum* P. Mill.** Cited in Taylor & MacBryde (1977) and Scoggan (1979) and although found in garbage dumps and waste places, not truly established.

***Nicandra physalodes* (L.) J. Gaertn.** Cited in Taylor & MacBryde (1977), based on a single plant (specimen in V) from a garden dump and not known to have become established.

***Physalis pubescens* L.** Cited in Scoggan (1979), based on an 1884 record from Cache Creek and collected once since then in Burnaby. This plant does not persist.

***Solanum tuberosum* L.** Cited in Scoggan (1979), based on a record in CAN from Liard Hot Springs, but not established.

TAMARICACEAE

***Tamarix parviflora* DC.** Reported by Taylor and MacBryde (1977), but not persisting in our region.

VIOLACEAE

***Viola nuttallii* Pursh.** This species, reported by Taylor and MacBryde (1977), occurs only east of the continental divide.

***Viola simulata* Baker.** Described by Baker from material collected at Shawnigan Lake (Henry 1915) and placed in synonymy with *V. langsdorfii* by Scoggan (1978). Prior to Baker's description of *V. simulata* the type material had been determined as *V. langsdorfii*. The status of the species remains in doubt.

ASPLENIACEAE

Asplenium scolopendrium **L.** (*Phyllitis scolopendrium* [L.] Newm.) Collected in Port Eliza Inlet, W coast of Vancouver Island by S.O. Charcott in 1980. The cytology of this population indicates that this is an introduction of a European taxon (Cody & Britton 1989).

DRYOPTERIDACEAE

Polystichum californicum **(D.C. Eaton) Diels.** Collected on Texada Island by W.B. Anderson in 1937. No recent collections.

Polystichum kwakiutlii **D.H. Wagner.** A recently described species based on a fragmented specimen (distal part of a single leaf) collected in Alice Arm, N Vancouver Island by A.D. York in 1935. This taxon is presumed to be, with *P. munitum*, one of the diploid parents of *P. andersonii* (Wagner 1993).

ISOETACEAE

Isoetes bolanderi **Engelm.** The voucher specimens from Akamina Pass ascribed to this species were re-identified by D.F. Brunton as *I. howellii.*

Isoetes truncata **(A.A. Eaton) Clute.** This is a hybrid of *I. maritima* x *I. occidentalis.*

APPENDIX II - NAME CHANGES

The following are name changes that have been made since Douglas *et al.* (1991, 1994).

Boykinia elata = *B. occidentalis*
Euphrasia arctica var. disjuncta = *E. disjuncta*
Huperzia miyoshiana = *H. chinensis*
Lindernia anagallidea = *L. dubia var. anagallidea*
Lycium halimifolium = *L. barbarum*
Lycopodium alpinum = *Diphasiastrum alpinum*
Lycopodium complanatum = *Diphasiastrum complanatum*
Lycopodium sitchense = *Diphasiastrum sitchense*
Mecodium wrightii = *Hymenophyllum wrightii*
Orthocarpus attenuatus = *Castilleja attenuata*
Orthocarpus castillejoides = *Castilleja ambigua*
Orthocarpus faucibarbatus ssp. albidus = *Triphysaria versicolor ssp. versicolor*
Orthocarpus hispidus = *Castilleja tenuis*
Orthocarpus pusillus = *Triphysaria pusilla*
Pellaea atropurpurea = *P. gastonyi*
Pellaea occidentalis ssp. simplex = *P. glabella ssp. simplex*
Polypodium virginianum = *P. sibiricum*
Salix brachycarpa ssp. niphoclada = *S. niphoclada*
Salix myrtillifolia var. cordata = *S. pseudomyrsinites*
Salix planifolia ssp. pulchra = *S. pulchra*
Salix reticulata ssp. nivalis = *S. nivalis*
Sarracenia purpurea ssp. purpurea = *S. purpurea ssp. gibbosa*
Saxifraga davurica ssp. grandipetala = *S. razshivinii*
Saxifraga funstonii = *S. bronchialis ssp. funstonii*
Selaginella densa var. scopulorum = *S. scopulorum*
Solanum sarrachoides = *S. physalifolium*
Valeriana dioica = *V. dioica ssp. sylvatica*
Verbena hastata = *V. hastata var. scabra*
Viola canadensis ssp. rydbergii = *V. canadensis var. rugulosa*
Viola pallens = *V. macloskeyi*

GLOSSARY[21]

Acerose — With a needle-like tip, "needle-pointed".

Achene — A dry, single-seeded fruit that does not open at maturity.

Acicular — Shaped like the needle of a pine tree, "needle-like".

Acorn — A 1-seeded fruit of oak trees.

Acuminate — Tapering to a narrow tip or concave point, the sides generally concavely narrowing.

Acute — Tapering to a point, the sides straight (i.e., not convex or concave), "sharp-pointed".

Adaxial — On the side of a structure, turned toward the main axis.

Adnate — Fusion or attachment of unlike parts (e.g., the calyx and corolla).

Adventitious — Development of structures in unusual locations; in the case of roots, generally refers to the development of roots from the stem or leaf.

Alternate — Any arrangement of leaves or other parts not opposite or whorled; arranged singly at different heights on the stem.

Ament — A pendulous spikelike inflorescence with apetalous, unisexual flowers; a catkin.

Amphiberingian — Occurring on both sides of the Bering Strait; a phytogeographic element resulting from past migration across the Bering Land Bridge.

Amplexicaul — Clasping the stem.

Androecium -- A collective term referring to male floral parts, that is, the stamens.

Androgynous — A spike bearing staminate (male) and pistillate (female) flowers where the staminate flowers are positioned above the pistillate flowers, closer to the tips of the inflorescence.

Annual — Living for only 1 growing season.

Anthesis — The period of time when a flower is fully open, "flowering time".

Apetalous — Without petals.

Apex — Tip, point or end.

Aphyllopodic — Having lower leaves that are bladeless or reduced to scales (e.g., *Carex* spp.).

Apical — Located at the tips.

Apiculate — "Abruptly sharp-pointed".

Apomictic — Capable of reproducing asexually.

Apomixis — Any of several types of asexual reproduction.

Aquatic — Living in water.

Arachnoid — Covered with long, delicate, tangled hairs; resembling a cobweb.

Aristate — Having an awn or a bristle at the tip, "awl-tipped".

Armed — Possessing prickles, spines, or thorns.

Articulate — Jointed; separating at a joint, by a clean cut scar, upon maturity.

Anther — The pollen producing sac of the stamen.

Attenuate — Gradually tapering to a slender base or tips.

Auct. non — Indicates that a species name is used commonly in the literature but is incorrect and is not the name used to refer to the type specimen.

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[21] Words or phrases used in lieu of technical terms in this manual appear in quotes in the glossary.

Auricle — An ear-shaped lobe or appendage.

Auriculate — With auricles; often used to describe the base of a leaf blade where there is an auricle on either side of the petiole; with "earlike lobes".

Awn — A slender bristlelike appendage, usually at the tips of a structure.

Axil — The angle between a structure and the axis to which it is attached (e.g., the angle between a leaf and the stem).

Axile placentation — A pattern of placentation where the ovules are attached to the partitions of a compound pistil near the center of the ovary.

Axillary — Used in reference to structures attached in the axil or juncture of stem and leaf stalks.

Banner — The largest, upper petal of a papilionaceous flower.

Barb — A short, firm, reflexed process.

Barbellate — Minutely or "finely-barbed"; bearing stiff hairs with barbs.

Basal — At, or forming, the base.

Beak — A long, slender projection on a broader structure such as a fruit or seed.

Bi — A prefix meaning two or twice.

Biennial — Living for two seasons.

Bifurcate — "Two-forked".

Bilabiate — "Two-lipped"; often with reference to an irregular flower.

Bipinnate — *See* bipinnatifid.

Bipinnatifid — Twice divided.

Biserrate — Doubly serrated.

Bisexual — Bearing both male and female reproductive structures.

Biternate — Two groups of three.

Bloom — *See* glaucous.

Bract — A modified leaf, reduced in size or form, that is associated with a flower or an inflorescence; in conifers, a main appendage arising from the axis of a cone.

Bractlet — A small or secondary bract (*syn.* bracteole).

Bristle — A stiff, hairlike structure.

Bristly — With bristles.

Bulb — A small, stout underground stem bearing modified (scalelike) leaves and fibrous basal roots; generally food storage organs.

Bulbiferous — Producing bulbs.

Bulbil — A small bulb produced above the ground, often on the flowering stem.

Caducous — Falling off the plant early relative to other similar structures.

Caespitose — Growing in dense, low-lying clumps, "tufted".

Calcareous — Rich in calcium carbonate.

Callose — Bearing callosities.

Callosity — *See* callus.

Callus — A hard or firm thickening of a structure; in grasses, the thick, hardened basal portion of the lemma.

Calyx — A collective name referring to the sepals, the outer whorl of the perianth.

Campanulate — "Bell-shaped" to saucer-shaped.

Cane — In *Rubus* spp., woody shoots that arise each year.

Canescent — Appearing white or grey due to very short, fine hairs.

Capillary — Very slender and "hairlike".

Capitate — In a "headlike" cluster.

Capsule — A dry, dehiscent fruit comprised of more than 1 carpel; method of splitting further classifies the capsule type (e.g., circumscissile, septicidal, etc.).

Carinate — "keeled".

Carpel — The basic unit of a pistil, a modified seed bearing leaf.

Caruncle — An often fleshy appendage at or near the attachment point (hilum) of some seeds.

Caryopsis — The dry, 1-seeded fruit found in grasses.

Catkin — See ament.

Caudate — Bearing a terminal, long and slender appendage like a tail.

Caudex — The woody, thickened and persistent basal portion of a herbaceous perennial that gives rise to leaves and flowering stems each year, i.e., "stem-base".

Caulescent — Having an obvious leafy stem.

Cauline — Of, or pertaining to, the stem, i.e., "stem leaves".

Cellular — A term used in reference to the cell-shaped network of minutely raised and lignified ridges on epidermis (e.g., on the culm of some *Carex* spp.).

Chaffy — With thin dry scales or bracts; "scaly".

Chartaceous — Having the texture of stiff paper or parchment; "firm-papery", thickly membranous.

Ciliate — Leaves fringed on the margins,with fine hairs (cilia), "fringed".

Ciliolate — Ciliate but with smaller hairs.

Cinereous — Appearing grey because of short hairs.

Circumboreal — Distributed at the top or the bottom of the world in the boreal zone.

Circumpolar — Distributed around the North or the South Pole.

Circumscissile — A capsule that dehisces transversely in a circular line, like the opening of a lid.

Clavate — "Club-shaped", the wider portion at the tips.

Claw — The narrowed, basal portion of some petals or sepals.

Cleft — Usually applied to leaf margins and sinuses cut sharply and about half-way to the midrib or base; deeply lobed.

Collar — In grasses, the band on the outside area of the leaf at the point where the leaf blade and the sheath converge.

Coma — A tuft of hair usually at the tips of structures like seeds.

Compound — With 2 or more parts or components.

Confluent — Structures merging into 1; fusing at the bases.

Conic — Cone-shaped; "conelike".

Connate — Union or attachment of like parts (e.g., petals), "fused".

Connivent — Convergent but not fused.

Convolute — The arrangement of petals or sepals such that each petal or sepal has 1 edge exposed while the other is covered; in grasses, a leaf that is rolled longitudinally so that 1 edge is inside the other.

Cordate — Shaped like a heart, with the notch at the base; "heart-shaped".

Coriaceous — Having a thick and leathery texture.

Corm — A thickened, underground stem with papery leaves; a storage organ.

Corniculate — Bearing small horns.

Corolla — The collective term describing the petals of a flower.

Corymb — A flat-topped, indeterminate inflorescence where pedicels of florets are progressively shorter towards the center of the inflorescence; may be simple or compound.

Corymbose — A flat or convex-topped inflorescence; resembling a corymb.

Costa — A prominent rib or vein.

Cotyledon — The first functional leaf of a seedling.

Crenate — Toothed with rounded, broad teeth, "round-toothed".

Crenulate — Crenate but with smaller teeth.

Crown — The persistent basal portion of a perennial plant (e.g., grass), or the leafy portion of a tree; any appendage situated between the corolla and the stamens.

Cruciform — Having the shape of a cross, "cross-shaped".

Cucullate — Hooded or "hood-shaped."

Culm — The flowering stem of grasses, sedges and rushes.

Cuneate — Triangular or "wedge-shaped" with the acute angle at attachment point.

Cupulate — Cup-shaped; "cuplike".

Cuspidate — Bearing a short, rigid and sharp point, usually in reference to the tips of a leaf, "awl-tipped".

Cyme — An inflorescence in which all floral axes terminate in a single flower with the terminal flower, at the apex of the inflorescence, blooming first.

Cymose — Bearing cymes, or cyme-like.

Deciduous — Seasonal shedding of leaves or other structures after the growth period.

Decumbent — Lying on the ground with the end curved upward.

Decurrent — A structure adnate or confluent to the stem near its insertion point, with an adnate wing or margin extending down the stem or axis below the point of insertion.

Definite — Distinct; precise.

Deflexed — Bent downward or backward.

Dehiscent — Discharge of contents by the opening of pores or slits, most often pertaining to the opening of fruit at maturity.

Deltoid — Shaped like an equilateral triangle.

Dentate — With sharp, spreading teeth, "sharp-toothed."

Determinate — An inflorescence with the terminal or central flower developing first.

Dichotomous — Forked with both branches of approximately equal size.

Didymous — Occurring or developing in pairs.

Dimorphic — Having 2 forms.

Dioecious — Male and female reproductive structures borne on different plants.

Disarticulate — The separation of structures at maturity.

Disciform — With the form of a disk; in the Asteraceae, with the central flowers of a head perfect (or functionally staminate) and the marginal flowers pistillate but without a ligule.

Discoid — Resembling a disk; in the Asteraceae, with the flowers of a head all tubular and perfect (or functionally staminate).

Disk corolla (disk flower) — Tubular corolla or flower of some members of the Asteraceae.

Dissected — Divided into many small, fine and often repeated parts or segments.

Divaricate — "Widely spreading".

Dorsal — Pertaining to, or located on, the back of an organ.

Drupe — A fleshy, 1-seeded or 1-stoned fruit of some plants of the rose family (e.g., cherries, peaches).

Dystrophic — A water body turning brown with suspended organic material and having a high carbon to nitrogen ratio of 10:1 or greater.

Elliptic — Shaped like an ellipse, the broadest point midway between the ends, and the width about one half the length.

Emarginate — Having a shallow notch at the tips, usually with reference to a leaf or petal.

Endocarp — The innermost layer of the three layers comprising the mature ovary wall of a fruit.

Entire — A continuous margin, without teeth or divisions.

Epigaeous — Growing above ground.

Epiphytic — A plant that grows on another plant but does not receive nourishment from it.

Equitant — With alternate leaves whose basal portions overlap and are flattened lengthwise (e.g., *Iris*).

Erose — An irregular margin, appearing eroded or gnawed, not fringed or toothed.

Ex — With respect to plant authorities, indicates that the first author proposed the name for a plant and the second author published that name.

Exfoliate — To peel off in shreds, thin layers or plates, as bark from a tree trunk.

Exserted — Projecting beyond a surrounding structure, like stamens projecting beyond a corolla.

Extravaginal — Located outside the sheath that surrounds another organ.

Falcate — Sickle-shaped; curved sideways and tapering.

Farinose — Covered with a white mealy substance.

Fascicle — A cluster.

Ferruginous — Rust in colour.

Filament — The slender stalk of the stamen that supports the anther.

Filiform — "Threadlike", slender and cylindrical.

Fimbriate — Fringed with hairs coarser than cilia.

Fistulose — Hollow.

Flabellate — "Fan-shaped".

Flabelliform — *See* flabellate.

Flexuous — Bent in opposite directions; having a more-or-less zig-zag or wavy form.

Floccose — Covered with tufts of soft woolly hairs that usually rub off readily.

Floret — A small flower, particularly 1 in a floral cluster; pertains also to the flower of a grass spikelet which includes the lemma, palea and reproductive structures.

Foliaceous — "Leaflike".

Follicle — A dry, dehiscent fruit composed of 1 carpel that splits at the side upon maturing to release its seeds.

Fornix (*pl.* fornices) — A small, scale-like or petaloid appendage in the tube or throat of the corolla.

Free central placentation — A pattern of placentation where the ovules are borne on a single stalk, which is anchored at the base of a 1-celled ovary.

Frond — The leaf of a fern.

Fruit — The ripened ovary and any other structures that enclose it.

Funnelform — "Funnel-shaped," usually pertaining to the corolla.

Fusiform — "Spindle-shaped," broadest at the middle and tapering to opposite ends.

Galea — The hooded portion of the perianth in some irregular or bilabiate flowers.

Gametophyte — The sexual reproductive stage of a plant that produces gametes; in ferns it is often the small inconspicuous form of the plant.

Gamopetalous — Flowers which are fused to any degree.

Geminate — "in pairs".

Gemma (*pl.* gemmae) — A young bud which, when detached, forms a new plant vegetatively.

Geniculate — Abruptly bent.

Gibbous — Swollen on 1 side.

Glabrate — "Nearly smooth," or becoming smooth, usually with age.

Glabrescent — *See* glabrate.

Glabrous — "Smooth"

Gland — A spot or structure that produces a sticky or greasy substance.

Glandular — Having glands.

Glandular-pubescent — With gland-tipped hairs, "glandular-tipped".

Glaucous — Covered with a whitish or bluish waxy powder that readily rubs off; with a bloom.

Globose — Spherical.

Glochidia — Retrorsely barbed hairs.

Glomerate — Aggregated or condensed into heads.

Glomerule — A dense cluster, usually of flowers.

Glumes — The 2 small bracts located at the base of a grass spikelet; they do not subtend flowers.

Glutinous — Covered with a sticky, glue-like resin.

Gynaecandrous — A spike bearing staminate (male) and pistillate (female) flowers where the staminate flowers are positioned below the pistillate flowers, thus the pistillate flowers are closest to the spike tips.

Hastate — Shaped like the head of an arrow with the basal lobes flaring outward, "arrowhead-shaped".

Head — A dense indeterminate inflorescence of sessile (or nearly sessile) flowers, situated on an axis that is much compressed vertically and sometimes flattened or saucer-shaped.

Hemispheric — In reference to a head, with a half-sphere shape.

Herb — Plant with stem that dies back to the ground after flowering or at the end of the growing season.

Herbaceous — A non-woody plant.

Heterophyllus — Having 2 types of leaves.

Heterosporous — Production of 2 different types of spores, generally differing in size.

Hirsute — Covered with long, stiff and coarse hairs, "stiff-hairy".

Hirtellous — Minutely hirsute.

Hispid — Bearing long, rigid and very sharp bristles or "bristlelike" hairs.

Hispidulous — Slightly hispid.

Hoary — Covered with short and fine white or grey hairs.

Homophyllous — With leaves that are all identical or very similar in form.

Homosporous — Production of one type of spore.

Hyaline — Thin, almost completely transparent tissue, translucent, "wax papery".

Hybrid — A cross between 2 taxa, usually a cross between 2 species of the same genus.

Hypanthium — A cup-like structure surrounding the ovary, formed by the fusion of the basal portions of the perianth, calyx, corolla and androecium.

Imbricate — Partly overlapping in a spiral manner, shingle-like, "graduated".

Imperfect — Flowers lacking either female or male reproductive structures, a unisexual flower.

Indeterminate — An inflorescence with the terminal or central flower developing last.

Incised — Cut sharply, deeply and irregularly, as in leaf margins.

Indument — Appendages or outgrowths from the epidermis of a plant, a collective term, of hairs or scales.

Indurate — Hard or stiff.

Indusium (*pl.* indusia) — A scale-like outgrowth that covers and protects the cluster of sporangia located on the underside of a fern frond.

Inferior (ovary) — When the perianth and androecium are fused at the top of the ovary wall, the ovary position is described as inferior.

Inflorescence — The flowering cluster, categorized by the arrangement of flowers on the floral axis.

Intergradients — Taxa that interbreed and consequently share many characteristics making it difficult to separate them taxonomically.

Internode — The section of a stem or another structure between 2 nodes.

Interrupted — Discontinuous, with gaps.

Involucre — A rosette of bracts subtending an inflorescence or head.

Involute — Margins longitudinally rolled in, on the upper side, toward the center.

Irregular — Pertaining to a flower in which similar parts (e.g., petals) are unequal in shape and size (*syn.* zygomorphic).

Keel — In a papilionaceous flower, the 2 lowermost connate petals; resembles the keel of a boat; in grasses, the sharp crease or ridge of the leaf blades, the lemma or the glume.

Lacerate — With an irregular or jagged margin, as if torn.

Laciniate — Cut into narrow, often pointed, lobes.

Lamina — The flattened portion (i.e., the blade) of a leaf or petal.

Lanate — Woolly, with long intertwined, curly hairs.

Lanceolate — Longer than broad, widening above the base and tapering to the tips.

Leaflet — One of the segments or divisions of a compound leaf.

Lemma — The 2 outermost bracts that subtend the grass floret (see palea).

Lenticular — Biconvex in shape.

Ligulate — With a ligule.

Ligule — Flattened part of the ray corolla in the Asteraceae; in many grasses and some sedges and rushes, a membranous (or hair-like) appendage on the inner side of the leaf at the junction of the leaf blade and the sheath.

Linear — Long and narrow, with parallel margins.

Locule — A compartment in the ovule or anther.

Lustrous — Shiny.

Lyrate — Pinnatifid with the end lobe enlarged and rounded.

Maculate — "Spotted".

Malpighiaceous — Hairs attached to a surface by their centers.

Maritime — Near to, or influenced by, the sea.

Megasporangia — The sporangia of a heterosporous plant that produces megaspores.

Megaspore — On a heterosporous plant, the larger of 2 spore sizes produced; a spore involved in development of female reproductive organs.

Mericarp — One portion of the fruit (e.g., a schizocarp) that splits into 2 halves at maturity, found in members of the Apiaceae and the Haloragaceae.

Merous — A suffix referring to the division of floral parts, e.g., a 3-merous flower would have 3 petals, 3 sepals, 3 stamens, and a pistil with 3 carpels.

Mesic — Relating to habitats with a moderate or average amount of moisture.

Microsporangia — The sporangia of a heterosporous plant that produces microspores.

Microspores — On a heterosporous plant, the smaller of 2 spore sizes produced; a spore involved in the development of male reproductive organs.

Monoecious — Male and female reproductive structures borne on the same plant.

Mottled — Marked with spots.

Mucro — A small, short and abrupt point.

Mucronate — Having mucro or abrupt, short projection on the mid-vein at the leaf tip.

Muricate — Roughened with short, firm and sharp projections.

Naked — Lacking various organs, hairs or appendages.

Naturalized — A well established plant originating from another area.

Neutral — In reference to a flower lacking functional stamens and pistils.

Nodding — Curving to 1 side; minutely pendulous.

Node — The location on a stem where stems or leaves usually originate, generally a swollen area, other structures like tendrils and flowers may also originate here.

Nom. superfl. — A plant name that has been superseded by a valid name; a superfluous name.

Nut — A hard, indehiscent fruit, with 1 seed.

Nutlet — A small nut; also used when referring to each lobe of the 4-lobed nuts found in borages.

Ob — A prefix meaning in the reverse of the typical direction.

Obconical — Conical in shape with attachment point at the narrow end of the cone.

Obcordate — Having an inverted heart shape, "heart-shaped".

Oblanceolate — Reverse of lanceolate, widest above the middle and tapering to the base.

Oblong — Much longer than wide with parallel or nearly parallel sides.

Obovate — The reverse of ovate; attached at the narrow end, "egg-shaped".

Obpyramidal — Having the shape of an inverted pyramid.

Obsolete — Reduced to the point of being entirely, or almost, undetectable.

Obtuse — Blunt, rounded.

Ochroleucous — Yellowish-white to buff or cream-coloured.

Oligotrophic — A water body low in nutrients.

Olivaceous — Olive-like in colour.

Operculate — Provided with an operculum; a little lid, the deciduous cap of a circumscissile fruit, or a fruit that dehisces along the circumference near the tips.

Orbicular — Having a circular outline.

Ovary — The enlarged base of the pistil that encloses the ovules of angiosperms.

Ovate — Shaped like a hen's egg, attached at the broader end, "egg-shaped". Term applied to plane surfaces.

Ovoid — Shaped like a hen's egg, "egg-shaped". Term applied to solid objects.

Ovule — A young or undeveloped seed.

Palea — The innermost of the 2 bracts that subtend the floret in grasses (see lemma).

Palmate — Lobed or divided in a palm- or hand-like fashion, digitate.

Panicle — A branching inflorescence on which younger flowers are borne at the tips.

Paniculiform — Resembling a panicle.

Papillate — Covered with small minute rounded protuberances (papillae, "pimples").

Papilionaceous flower — A strongly irregular flower with five petals, the lowermost 2 petals are connate (fused) and form the keel, as in Fabaceae.

Pappus — The modified outer perianth series crowning the ovary and achene in the Asteraceae; usually plumose, bristle-like, or of scales.

Parietal placentation — A pattern of placentation, in compound pistils only, where ovules are attached to the outer wall of the carpel.

Pectinate — "Comb-like", pinnately lobed with narrow segments arranged like the teeth of a comb.

Pedicel — The "stalk" of a single flower in an inflorescence, or of a spikelet in grasses.

Pedicellate — Having a pedicel, a "stalk".

Peduncle — The single supporting stalk of a flower or inflorescence.

Peltate — An umbrella-shaped leaf whose attachment point is on the underside of the leaf rather than at the base or margin, "umbrella-like".

Pendulous — Hanging or drooping.

Perennial — Growing for more than 2 seasons.

Perfect — A flower that has functional stamens and pistils.

Perfoliate — Bearing opposite leaves whose bases are wrapped around the stem and connate, giving the appearance that the stem passes through the leaf.

Perianth — A collective term for the calyx and corolla.

Perigynium — A "pouched" bract surrounding the pistil or achene in *Carex* spp.

Persistent — Remaining attached.

Petiole — Leaf stalk.

Phenotypic plasticity — Ability to adapt, morphologically, to changing environmental conditions.

Phyllode — A somewhat expanded but bladeless petiole taking on the function of a leaf.

Phyllopodic — Having well developed lower leaves instead of scales.

Piliform — Having the shape of a long, sometimes wavy, hair.

Pilose — Shaggy with soft hairs, "soft hairy".

Pinna (*pl.* pinnae) — One of the primary divisions of a pinnately compound leaf or frond.

Pinnate — Compound leaf with the leaflets on both sides of an elongated axis.

Pinnatifid — Pinnately lobed.

Pinnule — A secondary leaflet in a bipinnately compound leaf.

Pistillate — Flowers possessing pistils, but no functional stamens (i.e., a female flower).

Pith — The spongy tissue in the center of a root or stem that surrounds vascular bundles.

Placentation — The pattern of attachment of ovules in the ovary. *See* axile, parietal or free central placentation.

Plumose — "Feather-like".

Pod — Any type of dry, dehiscent fruit.

Pollen — A general term pertaining to the haploid (n) microspores produced in the anther.

Polypetalous — Flowers with all petals distinct, not united.

Polyploidy — Two or more sets of chromosomes (e.g., 3n, 4n, 8n).

Prehensile — Grasping.

Prickle — Small, sharp outgrowth from epidermis, contains no vascular tissue.

Prismatic — Prism-shaped.

Procumbent — Prostrate or trailing stem, does not usually root at nodes.

Propagule — Any part of a plant capable of growing into a new organism; e.g., seed, spore, gemma, cutting.

Pro parte — In part.

Pro parte sed non typus — Resembles, in part, but not completely the type specimen; possessing some but not all characteristics of the type specimen.

Prostrate — Lying flat on the ground, may root at the nodes.

Pruinose — *See* glaucous.

Puberulent — Bearing very short, loose or erect hairs, scarcely visible to the unaided eye, minutely pubescent, "short-hairy".

Pubescent — "Hairy".

Pulverulent — Dusty, powdery.

Pulvinus — Swollen tissue at the insertion point of the leaf petiole, or sometimes at a joint.

Punctate — Marked with pits or dots formed by glands or waxy spots.

Puncticulate — Minutely punctate.

Pyriform — Pear-shaped.

Raceme — An indeterminate, elongated inflorescence where single flowers are borne on pedicels arranged on a single axis; the youngest flowers are at the tips.

Racemiform — Possessing the form of a raceme.

Rachilla — The axis of a spikelet in grasses, refers to a secondary axis in sedges.

Rachis — The main stalk of an inflorescence or compound leaf, the "axis of inflorescence".

Radiate — In the Asteraceae, "heads with ray and disk flowers".

Ray (flower) — Strap-shaped corolla (ligule), as in the Asteraceae.

Receptacle — The expanded end of the stem on which floral parts are borne.

Reclining — Lying on the ground or 1 plant pressed on another.

Reflexed — Bent sharply downward or backward.

Regular (flowers) — A flower with radial symmetry; petals and sepals that are similar in shape, size, colour and orientation.

Reniform — "Kidney-shaped".

Resinous — Covered with a resin.

Reticulate — Forming a network, netted like the veins of a leaf, "net-veined".

Retrorse — Directed backward or downward.

Retuse — *See* emarginate.

Revolute — Leaf margins rolled toward the underside of the leaf.

Rhizome — A creeping, underground stem or rootstalk that roots at the nodes.

Rhombic — "Diamond-shaped".

Rib — A prominent vein, usually on a leaf.

Root — The descending axis of a plant that anchors and absorbs moisture from the ground, lacks nodes and internodes.

Rootstock — Used loosely to mean a main root or an underground root-like stem or branch.

Rosette — A dense cluster of flowers or leaves radiating around a central axis, usually basal in the case of leaves.

Rosulate — In the form of a rosette.

Rotate — Flat and circular in outline; "saucer-shaped" or "wheel-shaped".

Rotund — Rounded.

Rudimentary — Usually a small, imperfectly developed structure, generally reminiscent of an earlier evolutionary stage.

Rufous — "Reddish-brown".

Rugose — Possessing a "wrinkled" surface.

Rugulose — Slightly rugose.

Saccate — Shaped like a sac or pouch.

Sagittate — Shaped like the head of an arrow, triangular with the basal lobes pointing backward, "arrowhead-shaped".

Salverform — A corolla having a long slender tube that flares abruptly at the end.

Samara — A winged, indehiscent fruit.

Samaroid — Resembling a samara.

Saprophytic — A plant that derives its nutrients from dead organic matter and lacks the chlorophyll that gives most plants their green colour.

Scaberulous — Slightly scabrous.

Scabrid — *See* scabrous.

Scabridulous — *See* scaberulous.

Scabrous — Having a roughened surface caused by very short stiff hairs or short sharp projections, "rough short-hairy".

Scabrule — A stiff pointed projection or a short stiff hair.

Scale — A small, flat structure resembling the scale of a fish.

Scape — A flowering stem without leaves.

Scapose — Bearing a scape.

Scarious — Having chaffy, membranous, brown or "wax-papery" edges.

Scrambling — Slightly reclining.

Scree — Relatively small broken rock material characteristic of alpine areas, usually a result of freeze-thaw cycles.

Secund — Having all flowers or branches borne on 1 side of the axis.

Semi-aquatic — A plant that may tolerate partial submersion in water or a plant that roots in the soil but produces aquatic leaves.

Sensu lato — In the broad sense.

Sepals — The outermost whorl of floral leaves, also called the calyx and is usually green in colour.

Septum — A partition; in an ovary, a partition formed of the fused walls of adjacent carpels.

Seriate — In a series of rows.

Sericeous — A surface with long, soft, appressed hairs, giving a silky appearance and texture, "silky-hairy".

Serrate — "Sharp-toothed"; like a saw edge.

Serrulate — A leaf margin with small serrated teeth.

Sessile — Without a stalk, "unstalked".

Seta (*pl.* setae) — A bristle.

Setose — Bearing setae.

Sheath — An thin tubular organ that partially or wholly surrounds another organ; in grasses, the basal portion of the leaf blade that wraps around the stem.

Shrub — A woody perennial plant, less than 10 m tall, with several basal stems.

Silicle — A dry fruit of plants in the Brassicaceae generally not more than 2 times longer than wide which opens along the edges leaving the seeds attached to a central partition.

Silique — A long slender fruit (such as that of the Brassicaceae family) which splits open along the edges leaving seed attached to a central partition.

Simple — A leaf not compounded into leaflets, or an unbranched inflorescence.

Sinuate — A pronouncedly waved leaf margin, "wavy".

Sinus — "Notch", a cavity or a depression between 2 adjacent structures (e.g., the space between 2 lobes of a leaf).

Smooth — Without hairs of any type.

Sordid — "Dirty tinged".

Sorus (*pl.* sori) — A cluster of spore producing structures (sporangia) on the underside of a fern frond.

Spadix — A spike with small, densely crowded, unisexual flowers on a thick and fleshy axis, the inflorescence is subtended by a spathe.

Spathe — A large bract surrounding a spadix.

Spatulate — Broad and rounded at the tips; narrowing to the base, "spoon-shaped".

Spiciform — An inflorescence resembling a spike, "spike-like".

Spike — An unbranched inflorescence; flowers are sessile.

Spikelet — A small spike; in grasses, the primary inflorescence composed of 2 glumes and 1 or more florets.

Sporangia — Spore producing structures.

Sporangium — Reproductive structure of ferns that produces spores.

Spore — A haploid *(n)* reproductive cell.

Sporocarp — The structure that contains the sporangia in ferns.

Sporophore — A leaf bearing reproductive structures; generally used in reference to the spore bearing leaves of ferns.

Sporophyll — A modified leaf bearing sporangia.

Sporophyte — The generation in the reproductive cycle of plants that produces spores; in ferns generally refers to the conspicuous form of the plant (see gametophyte).

Spur — A slender and hollow floral appendage, generally nectariferous.

Squamiform — "Scalelike".

Squarrose — Having parts, generally at the tip of a structure, that are abruptly curving and spreading.

Stamen — The male sex organ of a plant constructed of an anther and a filament, the anther produces pollen.

Staminate — Flowers bearing stamens but no functional pistils; a male flower.

Staminode (*pl.* staminodia) — A sterile, sometimes modified stamen (*syn.* staminodium).

Stellae — Star-shaped structures.

Stellate — "Star-shaped"; having many rays radiating out from a common center.

Steppe — An extensive area of dry, semi-arid grassland.

Sterile — Infertile flowers.

Stigma — The generally expanded, apical portion of the pistil which is receptive to pollen.

Stipe — A stalk supporting the pistil; also the petiole of the frond of a fern.

Stipitate — Borne on a stipe or short stalk.

Stipule — An appendage on each side of the base of a leaf or petiole at its insertion point on the stem.

Stolon — An elongate, creeping, above-ground horizontal stem that roots at the nodes or at the tips.

Stramineous — Having the colour of straw, "straw-coloured".

Strigillose — Like strigose but with shorter hairs, "short appressed-hairy".

Strigose — A surface having sharp, appressed and straight hairs that are stiff and often basally swollen, "appressed-hairy".

Style — A generally elongated stalk connecting the ovary and the stigma through which the pollen tube grows.

Styliform — Resembling a long slender stalk, like a style.

Stylopodium — A disk-like enlargement at the base of the style.

Sub — A prefix signifying below, somewhat, slightly or rather.

Subspecies (ssp.) — A category of biological classification ranking immediately below the species level; also see page 5.

Subtend — To be positioned directly or closely beneath something.

Subulate — Narrowly triangular and tapering to a small point like an awl, "awl-like".

Succulent — Fleshy, having a soft and thickened texture.

Sulcate — Longitudinally grooved or furrowed.

Superior ovary — An ovary which is attached to the summit or center of the receptacle and is free from all other flower parts.

Sympatric — Occurring in the same area.

Sympodial — Having an apparent main or central axis that is actually comprised of several short overlapping branches.

Synonym — An equivalent superseded name, a second name to a given taxon.

Talus — An accumulation of rock material on or at the base of a slope, larger material than scree.

Taproot — An underground tapering, main root from which smaller lateral roots may form (may be thick or thin).

Tendril — A long, slender, generally twisting structure from which a climbing plant acquires its support.

Tepals — A collective term applied to petals and sepals when they are morphologically identical.

Terete — A structure that is circular in cross section but imperfectly cylindrical since the object may taper 1 or both ways.

Ternate — Arranged in groups of three.

Tetrad — In groups of four.

Thyrse — An elongated and densely flowered panicle, often contracted and pyramidal in shape.

Thyrsoid — Resembling a thyrse.

Tomentose — Densely pubescent with soft, matted wool-like hairs, "woolly-hairy", "woolly".

Tomentulose — Slightly tomentose or "slightly woolly".

Toothed — Bearing teeth-like protrusions.

Torose — Having successive swellings and contractions, "constricted between the seeds".

Torulose — Slightly torose.

Tri — A prefix meaning three or three times.

Tricuspidate — *See* cuspidate.

Trifid — Separation into three parts.

Trifoliate — A compound leaf with three leaflets.

Trigonous — Having three angles.

Tripinnate — Branched three times.

Triquetrous — With three sharp angles, like a triangle with concave sides.

Trophophore — A vegetative leaf or frond, one that does not have reproductive structures attached.

Truncate — Cut-off at the end; having a squared shape at the tips or base.

Tuber — A thickened, modified underground stem having many buds (e.g., a potato).

Tubercle — A small, rounded swelling.

Tuberculate — Bearing tubercles.

Tuberous — Thickened; producing tubers.

Turbinate — Inversely conical, "top-shaped".

Turgid — "Swollen".

Turion — A small, scaly bud-like offset on an underground stem.

Type specimen — A specimen identified by the author of a species that, morphologically, represents the best example of this species (*syn.* holotype).

Umbel — An inflorescence in which all flowers arise from a common point, younger flowers are in the center, may be simple or compound.

Umbellate — Arranged in umbels, umbel-like, "umbrella-like".

Umbellet — A secondary umbel in a compound umbel.

Undulate — A slightly wavy margin.

Uniseriate — Arranged in a row or series.

Urceolate — "Urn-shaped".

Valve — One of the segments into which a dehiscent fruit splits at maturity.

Variety *(var.)* — A category of biological classification ranking immediately below the species or subspecies level; see also page 5.

Veins — Thin threads of vascular tissue, as in a leaf.

Velutinous — Having a velvety texture.

Vernal — Pertaining to, or appearing in, spring.

Verrucose — Covered with wart-like protrusions, "wartlike".

Verticillate — *See* whorled.

Verticils — *See* whorl.

Vestige — The reduction of a structure whose functional importance has decreased with evolutionary time.

Villous — With long and soft, unmatted hairs, "long-hairy".

Viscid — Glutinous, greasy, or sticky.

Wanting — Lacking.

Whorl — Three or more structures arranged in a circular manner around a common insertion point.

Whorled — Having whorls.

Wing — A thin membranous outgrowth.

Winged — Bearing wings.

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